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Waste Data System User's Manual

U.S. Department of Energy

Revision 19

Effective Date: January 10, 2019

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Effective Date: January 10, 2019

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Office of the National TRU Program

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHANGE HISTORY SUMMARY

REVISION NUMBER	DATE ISSUED	DESCRIPTION OF CHANGES
18	08/07//18	• This is an extensive revision; therefore, no change bars are present. • Added information to determine training and qualification requirements for roles in WDS. • Added a sentence in section 2.1 • Modified Table 1 – WDS Roles and User Characteristics • Added Note on Page 26. • Added On-Line Help content. • Added Appendix B – WDS technical description of Container Data Submission Web Service. • Added Appendix C – WDS technical description of Acceptable Knowledge Information Service. • Added acronym AMWTP, CDATA, CCP, IDC, mrem/hr, OAKES, SME, SOAP, SPM, WSDL and XML. • Updated Internet Address, and added Read-Only address. • Deleted acronym BOKE and replaced with BOK. • Reformatted notes per MP 4.4 • Modified section 15.0 • Added References 16.0
19	01/10/19	• Divided the Shipper Generator dashboard into separate dashboards for the Waste Certification Official (WCO) and Transportation Certification Official (TCO). • Deleted the WDS Data Dictionary is maintained by WITS personnel and is updated for each WDS release in Section 2.1.1. • Deleted as of revision 5 in Section 2.1.4. • Corrected EA number listed in Section 4.2. • Modified Section 6.2 and Table 1 - WDS Roles and User Characteristics. • Replaced term Shipper Generator to Waste Certification Official (WCO) and Transportation Certification Official (TCO) throughout the document. • Modified Section 6.3. • Replace Packaging Dashboard screen shot in Section 6.7. • Deleted QA records in Section 13.0. • Deleted Minimum requirements prior to assigning user access to a WDS role which is not Read-Only role in Section 15.0.

ACRONYMS AND ABBREVIATIONS

AK	Acceptable Knowledge
AMWTP	Advanced Mixed Waste Treatment Project
BOK	Basis of Knowledge Evaluation
CBFO	Carlsbad Field Office
CCEM	Chemical Compatibility Evaluation Memorandum
CDATA	Character Data
CFR	Code of Federal Regulations
CH	Contact-Handled
CHTES	CH-TRAMPAC Evaluation Software
CCP	Central Characterization Program
CPR	Cellulose, Plastic, Rubber
CTMA	CH-TRUCON Maintenance Application
DA	Data Administrator
DB	Database
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DSA	Documented Safety Analysis
EPA	U.S. Environmental Protection Agency
ETS	Emplacement Tracking Software
FGE	Fissile Gram Equivalent
g/cc	Grams Per Cubic Centimeter
HalfPACT	HalfPACT Waste Shipping Container
HWFP	Hazardous Waste Facility Permit
ICV	Inner Containment Vessel
ID	Identification
IDC	Integrated Data Center
IP	Internet Protocol
IRM	Information Resources Management
IV	Inner Vessel
Kg	Kilogram
LDR	Land Disposal Restrictions
LWA	Land Withdrawal Act
m^3	Cubic Meters
MAR	material at risk
MgO	magnesium oxide

mrem/hr	millirem per hour
NIST	National Institute of Standards and Technology
NMED	New Mexico Environment Department
OAKES	Open Acceptable Knowledge Evaluation System
OC	Outer Container
OCA	Outer Containment Assembly
OJT	On-The-Job-Training
OPCTCD	Overpack Payload Container Transportation Certification Document
PATCD	Payload Assembly Transportation Certification Document
PCB	Polychlorinated Biphenyl
PCTCD	Payload Container Transportation Certification Document
PDF	Portable Document Format
PE-Ci	Pu-239 equivalent curie
PTCD	Payload Transportation Certification Document
QA	Quality Assurance
RCRA	Resource Conservation and Recovery Act
RH	Remote-Handled
RHTES	RH-TRAMPAC Evaluation Software
RTMA	RH-TRUCON Maintenance Application
SLB2	Standard Large Box 2
SME	Subject Matter Expert
SOAP	Simple Object Access Protocol
SPM	Site Project Manager
SWB	Standard Waste Box
T3MA	TRUPACT-III TRUCON Maintenance Application
TBO	To-Be-Overpacked
TCO	Transportation Certification Official
TDOP	Ten-Drum Overpack
TRAMPAC	Transuranic Waste Authorized Methods for Payload Control
TRU	Transuranic
TRUCON	TRUPACT-II Content Code
TRUPACT-II	Transuranic Package Transporter-Model II
TRUPACT-III	Transuranic Package Transporter-Model III
URL	Uniform Resource Locator
VE	Visual Examination
WAC	Waste Acceptance Criteria
WAP	Waste Analysis Plan
WCO	Waste Certification Official
WDS	Waste Data System

WIPP	Waste Isolation Pilot Plant
WIPPIVE	WIPP Instant Virtual Extranet
WITS	Waste Information Tracking System
WSDL	Web Services Description Language
WWIS	WIPP Waste Information System
XML	Extensible Markup Language

WASTE DATA SYSTEM DEFINITIONS

Acceptable Knowledge (AK) – Includes any documentation that describes or verifies site history, mission, and operations, in addition to waste-stream-specific information used to define the generating process, waste matrix, waste quantities, and contaminants (radiological and chemical).

Assembly – A group of waste containers, such as seven 55-gallon drums or pipe overpacks (seven-pack), three 100-gallon drums, one standard waste box (SWB), one standard large box 2 (SLB2), or one ten-drum overpack (TDOP) that are packed for placement in a transportation package.

Canister – Remote-handled (RH) transuranic (TRU) waste canister authorized for transport within the RH TRU 72-B shipping package.

Certification Program ID – Program that certifies the waste data prior to submittal to WIPP.

Certified Waste – Waste confirmed under a formal program to comply with acceptance criteria in an approved waste certification program.

CH-TRU Mixed Waste – Transuranic mixed waste with a surface dose rate not greater than 200 millirem per hour (mrem/hr).

Characterization – Sampling, monitoring, and analysis to identify and quantify constituents of a waste material, such as review of acceptable knowledge, nondestructive examination, visual examination, nondestructive assay, headspace gas sampling and analysis, or chemical analysis of volatile or semi-volatile organic compounds or metals.

Chemical Compatibility Evaluation Memorandum – The AK Expert performs chemical compatibility evaluations and prepares the Chemical Compatibility Evaluation Memorandum (CCEM). The chemical compatibility evaluation is based on the method described in EPA-600/2-80-076, A Method for Determining the Compatibility of Hazardous Wastes (EPA Method).

Content Code – Code describing generator or physical location of the waste, the physical and chemical form of the waste, and differences in packaging configurations used to demonstrate compliance with the applicable Transuranic Waste Authorized Method for Payload Control (TRAMPAC).

Current Location Site – Site where the waste is physically located.

Database – Electronic storage of data in a way allowing data manipulation and retrieval. Databases may include tables, fields, and records.

Destination Site ID – Site receiving a waste shipment for treatment, characterization, certification, or disposal.

Exit Code – Values returned by the application to assist the user in discovering the source of an evaluation failure and to inform the user more specifically of available shipment options in case of a "conditional" evaluation status.

Field – A single fact or data item. The smallest unit of named data that has meaning in a database. In a database table, fields are commonly referred to as columns.

Generator Site ID – Site that generated the waste

Inter-Site Shipment – A shipment of certified TRU waste containers meeting U.S. Department of Transportation (DOT) and other applicable requirements of the Certificate of Compliance for the shipping package used by the shipper. Inter-site shipments are those originating at a TRU waste generator site and being sent to a site for formal characterization, certification, and shipment to Waste Isolation Pilot Plant (WIPP).

Layers of Confinement – Any boundary restricting, but not prohibiting, release of hydrogen gas across the boundary. Examples of confinement layers are plastic bags (smaller inner bags or larger container bags) with allowable closure methods described in appendix 3.8 of the contact-handled (CH)-TRU Payload Appendices and metal containers fitted with filter vents.

Magnesium Oxide (MgO) Target Factor – The targeted amount of excess MgO, over and above the cellulose, plastic, rubber (CPR) components of waste, that has been emplaced in a WIPP disposal room.

Overpack Container – A payload container (85-gallon drum, SWB, TDOP) used to package one or more filtered waste containers, prior to placement of the configuration in a Type B shipping container. The overpacked containers meet a subset of the regulatory requirements outlined by the CH TRAMPAC, Waste Acceptance Criteria (WAC), and Waste Analysis Plan (WAP).

Package – (1) A packaging plus its contents; (2) packaging together with its radioactive contents as presented for transport.

Packaging – Assembly of components necessary to ensure compliance with packaging requirements of Code of Federal Regulations, Title 10, part 71
(10 CFR 71).

Payload – (a) Two assemblies (e.g., two 55-gallon drum seven packs or two SWBs) or one TDOP placed in a TRUPACT-II for shipment; (b) one RH 72-B canister placed in a RH72-B Cask for shipment; or (c) one SLB2 placed in a TRUPACT-III for shipment.

Record – Collection of related data treated as a unit. Records are collections of fields. One record contains data that pertains to a single thing (e.g., container). In a database table, the records are commonly referred to as rows.

RH 72-B Canister – Container transported in the RH 72-B Cask.

RH 72-B Cask – A U.S. Nuclear Regulatory Commission-certified Type B transportation packaging used for transportation of RH-TRU waste.

RH-TRU Waste – Transuranic waste with an external radiation dose rate greater than or equal to 200 mrem/hr and less than or equal to 1,000 rem/hr at the waste container's surface.

Shipment – A group of up to three reusable Type B shipping containers that will be shipped on one truck.

Shipment Confirmation – Performance of waste confirmation on a representative subpopulation of each waste stream shipment after certification and prior to shipment as described in the Hazardous Waste Facility Permit (HWFP). The Permittees will use radiography, review of radiography audio/video recordings, and visual examination (VE), or review of VE records (e.g., VE data sheets or packaging logs) to examine at least 7 percent of each waste stream in each shipment to confirm that the waste contains no ignitable, corrosive, or reactive waste, that the summary category group and waste matrix code are correct, and that all hazardous waste numbers are acceptable at WIPP. Waste confirmation will be performed by the Permittees prior to shipment of waste from the generator/storage site to WIPP.

Shipping Program ID – Program that performs shipping activities and ships the waste.

WIPP Waste Information System (WWIS) – A computerized data management system used by WIPP to gather, store, and process information pertaining to CH and RH TRU waste destined for, or disposed of, at WIPP. The WWIS database is a subsystem of the Waste Data System (WDS).

1.0 OVERVIEW

The Waste Data System (WDS) is a web-based software system used by the Waste Isolation Pilot Plant (WIPP) to gather, store, and process information pertaining to contact-handled (CH) and remote-handled (RH) transuranic (TRU) waste. The WDS incorporates data entry, data administration, and reporting functionality for waste shipments between the U.S. Department of Energy (DOE) generator sites and DOE sites where waste processing and repackaging are performed, and shipments to the WIPP Site. The WDS is used to create and store documentation about waste containers, shipments, and emplacement information at WIPP. The WDS is fully compliant with and implements the data requirements summarized in DOE/WIPP-02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (WAC), and other specified authorization basis documents. The WAC serves as the DOE's primary directive for ensuring that CH- and RH-TRU waste are managed and disposed of in a manner that protects human health and safety and the environment. The WDS includes all elements that were implemented in the WIPP Waste Information System (WWIS) to meet regulatory requirements for the operation of WIPP. The WWIS is a subsystem of the WDS.

The WDS allows users to upload container data, plan and create payloads using uploaded containers, and plan and create shipments using approved payloads. The WDS takes advantage of previously developed applications through direct integration and interfacing.

2.0 SUMMARY OF APPLICABLE AUTHORIZATION BASIS REQUIREMENTS AND PERMITS

The WIPP WAC summarizes requirements applicable to transportation, storage, and disposal of CH- and RH-TRU waste at WIPP. The WIPP authorization basis for disposal of CH- and RH-TRU waste includes the DOE National Security and Military Applications of Nuclear Energy Authorization Act of 1980 and the WIPP Land Withdrawal Act (LWA). The WAC summarizes requirements and associated criteria imposed by these acts and the Resource Conservation and Recovery Act (RCRA) on TRU waste destined for disposal at WIPP.

DOE TRU waste sites must certify CH- and RH-TRU waste payload containers to the WAC. The flow-down of applicable requirements to the WAC and integrated into WDS are traceable to several higher-tier documents, including, but not limited to:

- Waste Isolation Pilot Plant Documented Safety Analysis (DSA)
- Transuranic Package Transporter-Model II (TRUPACT-II), Transuranic Package Transporter-Model III (TRUPACT-III), and HalfPACT Certificates of Compliance for the transportation of CH wastes, and RH-TRU 72-B Certificates of Compliance for transportation of RH wastes
- WIPP LWA
- WIPP Hazardous Waste Facility Permit (HWFP)
- The U.S. Environmental Protection Agency (EPA) Compliance Recertification Decision and approval for polychlorinated biphenyls (PCBs) disposal
- The EPA letter of approval of the DOE's RH-TRU Waste Characterization Program

The WAC requires sites transmit required characterization, certification, and shipping data to WIPP using the WDS. The WDS is equipped with edit/limit checks to ensure data representing waste payload containers are in compliance with the WAC. The WAC requires sites to transmit required waste characterization, certification, and shipping data via the database before shipping TRU waste payload containers from a WIPP-accepted waste stream to WIPP. The WDS implements the authorization basis requirements by edit/limit checks included as a software module.

2.1 Edit/Limit Checks

This section describes the edit/limit checks incorporated into WDS software design. Additional information about edit/limit checks is available to users via screen-level and context-level online help. A full list of current edit limit checks performed by the WDS may be obtained by request from the WDS Data Administrator (DA) via email at DL_WDS_DA@wipp.ws or by telephone at (575) 234-7470.

2.1.1 WIPP HWFP – Waste Analysis Plan

The WDS container characterization edit/limit check evaluations are retrievable as a unit from the WDS middle-tier, and include container characterization Waste Analysis Plan (WAP) evaluation and container characterization data integrity evaluation.

2.1.2 WIPP WAC

The WDS container certification WAC evaluation includes applicable WAC edit/limit checks based on the container handling code. For both CH and RH containers, the container certification WAC evaluation includes the CH container edit/limit checks and the RH container edit/limit checks.

2.1.3 Transuranic Waste Authorized Methods for Payload Control

The CH-TRUPACT-II Content Code (TRUCON) Maintenance Application (CTMA), RH-TRUCON Maintenance Application (RTMA), and TRUPACT-III TRUCON Maintenance Application (T3MA) are specialized reference data applications used to manage TRUCON Code and Shipping Category data. The data provides references for performing the associated Transuranic Waste Authorized Methods for Payload Control (TRAMPAC) evaluations.

2.1.4 WIPP DSA

The WIPP DSA provides a summary of limits to be imposed on CH and RH containers in accordance with the Nuclear Criticality Safety Evaluation. The WDS conducts edit/limit checks on CH and RH containers according to the values described in Chapter 6 of the WIPP DSA, Prevention of Inadvertent Criticality. WDS Edit/Limit Checks and DA approval of the containers constitute an independent check of the data.

The WIPP DSA includes requirements from the WIPP WAC that apply to initial conditions in the DSA accident scenarios and are monitored through Key Elements in Chapter 18 that must be met prior to shipment to WIPP.

3.0 SCOPE

This user's manual provides users with summary information on data entry, data review, conducting searches, and producing output reports, and also describes helpful features contained in each topic-specific dashboard.

The software provides the ability to access the WDS User's Manual from each screen in the system after login. The software provides the ability to access screen-level help for each screen for which approved help content is available. In conjunction with the User Manual, the On-Line Help information is provided to users. The application also provides functionality for maintaining On-Line Help content. Access to the On-Line Help maintenance function is restricted to users with Data Administrator role. The user can access context-sensitive help for individual sections of a screen for which approved block-level help content is available. On-screen help is also available for the TRUCON Code field on the Container Certification Data Submittal screen on TRUCON Code/Shipping Category associations for CH containers (excluding SLB2 containers).

The MgO barcode application facilitates receipt and emplacement of CH waste shipments at WIPP. The application was designed to be used by wireless barcode scanners and tied directly to shipment and container information provided by the application. Appendix A provides a summary of the Emplacement Tracking System barcode application and the WDS Manual Emplacement Screen.

A read-only version of the WDS application and database provides access to all report and query functions, except for those available from screens for database updates. The read-only version does not allow access to screens or functions that perform database updates, except for updates to user preferences, password changes, and Report Builder query saves/updates. The read-only version is accessible only to registered WDS users. The read-only WDS address is https://wds.wipp.ws. To access the internal read/write version, the address is https://wds.wipp.carlsbad.nm.us.

4.0 SECURITY, ACCESS PRIVILEGES, PASSWORDS, AND CONNECTIVITY

This section provides information about security, passwords, and connectivity. This information can also be found in User Preferences screen-level help. WDS users who are external to WIPP access the system via DOENet or the WIPP Instant Virtual Extranet (WIPPIVE) server. Users who are internal to WIPP in Carlsbad and the WIPP site, access the WDS via WIPPNet. User Preferences screen-level help also provides instruction for obtaining help from the DA.

4.1 Security

Effective security is vital for safeguarding information and business processes. The WDS makes every reasonable effort to provide safe and secure access for users while maintaining the highest levels of data security. This section summarizes components that comprise overall security design for the WDS.

The goal of the WDS web server deployment is to closely follow recommendations set forth in the National Institute of Standards and Technology (NIST) Guidelines on Securing Public Web Servers. The NIST guidelines provide comprehensive standards for securing web servers and applications they contain. Security requirements and security controls in place to protect the accreditation boundary and the database have been implemented as described in the Department of Energy Office of Environmental Management Program Security Plan. System requirements are outlined in screen-level help for each dashboard.

4.2 Connectivity and WIPP Technical Support Contact Information

Prospective users who require access to the WDS may contact a DA via email at DL_WDS_DA@wipp.ws to request access to WDS. Alternatively, the prospective user may contact a DA by telephone at (575) 234-7470 to obtain an EA08NT1003-1-0. The prospective user will be sent a WDS Access Request Form via email. The prospective user will complete the form, provide justification of need for access to the application, have the form approved by a management sponsor, and return it via email to the DA. Upon receipt of the completed WDS Access Request Form, the DA will set up the user's account and interface with the WIPP Information Resource Management (IRM) Group to assist the user with any connectivity issues that may prevent the user from accessing the WDS. If necessary, completion of additional forms may be required to establish access to WIPP Secure Access (WIPPIVE), DOENet, and WIPPNet. After application forms are completed and approved, the prospective user will receive via email the Uniform Resource Locator (URL) (i.e., internet address) needed to connect to the system, along with instructions regarding security and maintenance of passwords.

4.3 User Accounts and Passwords

Each registered user is assigned a User identification (ID) and creates a password to log into the WDS application. The “complex” password criteria described here are also covered in User Preferences screen-level help. The software will display the password expiration date based on the default 90-day password expiration period. At the end of the 90-day password expiration period, the user is required to create a new password. The user's password must be a "complex" password that meets the following criteria:

- Password must be at least 12 characters long
- Password must contain three of the following:
    1. Uppercase letters (A-Z)
    2. Lowercase letters (a-z)
    3. Numbers (0-9)
    4. Special characters (! @ # $ % ^ & * ( ) + - = ? space)
- Passwords must not contain the user’s first or last name, or the account username
- Passwords cannot start with a number
- Old passwords cannot be reused
- Passwords must contain at least eight non-blank characters

When the user account is created, each user is assigned a primary role based on the functions the user will perform when using the WDS. For example, users who upload and submit container data to the WDS and users who create payloads and shipments are assigned the Waste Certification Official (WCO) and Transportation Certification Official (TCO) user role respectively. Connectivity, WIPP Technical Support Contact Information, and User Roles are explained in detail in screen-level help for each user role.

NOTE: In accordance with an approved program plan document, the DAs create, edit, and inactivate WDS user accounts, add or remove role associations to user accounts, and add or remove site/program associations with user accounts. Whenever an inactivated user account is reactivated, the password is reset. When a password is reset by the user or the DA, the password expiration date will be set based on the default password expiration period. The password can be changed at any time, which will initiate a new 90-day expiration period.

Users will receive a system message when passwords are within two weeks of expiration. Users who have not logged onto the WDS within prior 30 days will be notified via email of account inactivity, and users will be notified again after 60 days of inactivity. Accounts for users who have not logged into the WDS in the past 90 days will be automatically inactivated and the users will be sent an email message notifying them of their inactive account status.

Whenever a password is created or an existing password is reset, the user is required to confirm the new password by entering it a second time. Detailed instructions for creating and confirming a new password are outlined in screen-level help. After a user account is established, the user is permitted to update the following account record fields by clicking the user preferences link at the bottom of the page: first name, last name, phone number, fax number, company, address, city, state, zip code, password, email address, and email notification flag. The User ID cannot be edited.

Figure 4-A – WDS Login Page

NOTE: If the URL changes, users will be notified. At first login, users may add the WDS link to their browser Favorites list.

When the URL is entered into the browser or selected from the user's Favorites list, the WDS login screen will appear as shown in Figure 4-A. Read the Privacy and Security Notice prior to logging in.

To log in:

- Select the checkbox to agree to the terms of use.
- Enter a valid username in the User ID block.
- Enter a valid password in the Password block.
- Select database to be accessed from the database (DB) instance dropdown menu.
- Click the Login button.

NOTE: If the terms of use checkbox is unchecked, the user will be reminded to check the box before proceeding.

At first login, after the warning message has been confirmed and the login button is pressed, the software directs the new user to reset the password as shown below. Refer to this section and screen-level help for password requirements.

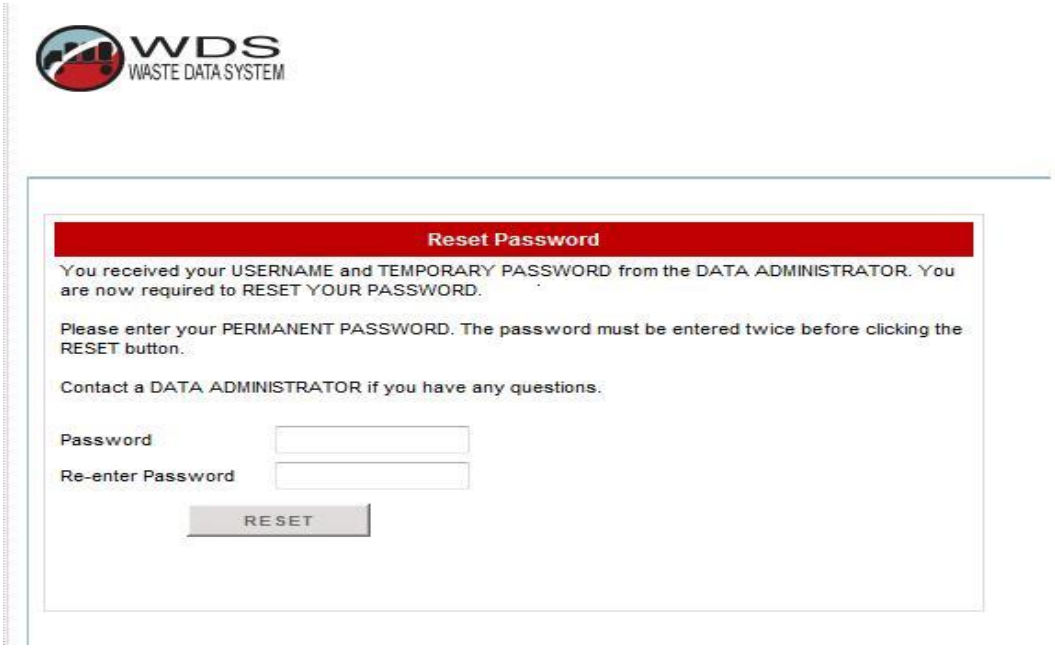

Figure 4-B – WDS Reset Password Page Example

The WDS stores the username, user Internet Protocol (IP) address, and date/time of login attempt for any login attempt to the system. The WDS will automatically close the current session after 30 minutes of inactivity. The user must then reenter identification and authentication information to access the WDS. The WDS enforces a limit of three consecutive invalid access attempts by a user during a 15-minute period, after which the WDS locks the account.

NOTE: Once the threshold of invalid login attempts has been reached, the account will be automatically locked for one hour or until a DA unlocks it. When an account is unlocked, the WDS requires the DA to generate the user password. After the DA has reset the user password, the user is required to create a new password upon the first login. The user is required to confirm the updated password by entering it a second time with an exact match.

Upon a successful login, any current and unexpired system messages are displayed. After acknowledgement of system messages, the software directs the user to the dashboard for the user's designated primary role. Dashboards are made available for selection by using the Dashboard dropdown menu.

5.0 VOLUME CONVERSION, WEIGHT CONVERSION, PACKING FRACTIONS, AND MgO CALCULATIONS

This section provides a basic summary of standard volumetric conversions used in the database and instructions for navigating the WDS.

The container volume of a CH waste container is defined in cubic meters (m^3) in the Container Types Reference Data Report.

The waste volume of a CH or RH payload container is calculated in m^3 as the sum of the container volume of the waste container(s) comprising the payload container, excluding the volume of dunnage containers. The waste volume of each pipe overpack is equal to the volume of the respective pipe component.

The container volume of an RH waste container is defined in m^3 in the Container Types Reference Data Report.

For weight conversion, the WDS converts kilograms (kg) to pounds by multiplying by a factor of 2.205. For all weight calculations, the software performs the calculation in kg and applies the conversion factor for pounds to the result when applicable. The waste container net weight is the sum of all material parameter weights for those material parameters identified as waste reported for the container.

5.1 Packing Fractions for Compacted Waste

The WDS determines the packing fraction based on the compaction level of a non-overpack container in grams per cubic centimeter (g/cc) of waste, based on the density of the CPR (excluding cellulosic and plastic packaging materials in pipe overpacks) present in the container compared to the density of polyethylene as follows:

- CPR density (g/cc) = ((waste CPR weight (kg) + packaging CPR weight (kg)) × 1000 (g/kg)) / (container volume (m^3) × 1000000 (cubic centimeters cubed [cm^3]/m^3))

- 20% poly density = .20 × .923 (g/cc) = .1846 (g/cc): If the container CPR density (g/cc) >.1846 (g/cc) and ≤.6461 (g/cc), the compaction level is defined as "partially compacted."

- 70% poly density = .70 × .923 (g/cc) = .6461 (g/cc): If the container CPR density (g/cc) >.6461 (g/cc), the compaction level is defined as "fully compacted."

- If the container CPR density (g/cc) ≤.1846 (g/cc), the compaction level is defined as "non-compacted."

The WDS determines the compaction level of an overpack container to be the highest level of compaction present in the individual containers in the overpack container. Refer to the Constants Reference Data Report for a listing of minimum/maximum values and units of conversion for reported radionuclide values used in the WDS.

5.2 Land Disposal Restriction Notification

If any waste stream profile associated with a shipment has not appeared on a previously sent shipment, or if any hazardous waste number has not appeared on a previously sent shipment in the waste stream profile associations present on a shipment, Land Disposal Restrictions (LDR) paperwork is required for the shipment. As an enhancement to ensure compliance with HWFP requirements regarding LDR notification, a message will appear on the shipment screen to prompt the user to initiate an LDR notification when needed.

5.3 MgO Excess Factor and MgO Excess/Deficit

The software calculates the MgO excess for a specified emplacement location (panel and room) using the following equation:

MgO Excess/Deficit (lbs) =

$$[\ m_{MgO} - [\ t_{p,r} \times 6 \times [\ [\ m_c + m_r + (1.7 m_p)\ ] \div 162\ ] \times 40.3\ ]\ ] \times 2.205$$

where

m_{MgO} = Total mass of MgO sacks in the specified Panel/Room (kg)
m_c = Total mass of cellulose (kg):
Cellulose in waste + cellulose in packaging + cellulose in MgO sacks + cellulose in emplacement assembly
m_r = Total mass of rubber (kg):
Rubber in waste + rubber in packaging + rubber in MgO sacks + rubber in emplacement assembly
m_p = Total mass of plastic (kg):
Plastic in waste + plastic in packaging + plastic in MgO sacks + plastic in emplacement assembly
$t_{p,r}$ = Target excess factor for panel and room

The software calculates the MgO Excess Factor for a specified emplacement location (Panel and Room) using the following equation:

Excess Factor =

$$m_{MgO} / [\ 6 \times [\ [\ m_c + m_r + (1.7 m_p)\ ] \div 162\ ] \times 40.3\ ]$$

where

m_{MgO} = Total mass of MgO sacks in the specified Panel/Room (kg)
m_c = Total mass of cellulose (kg):
Cellulose in waste + cellulose in packaging + cellulose in MgO sacks + cellulose in emplacement assembly
m_r = Total mass of rubber (kg):
Rubber in waste + rubber in packaging + rubber in MgO sacks + rubber in emplacement assembly
m_p = Total mass of plastic (kg):
Plastic in waste + plastic in packaging + plastic in MgO sacks + plastic in emplacement assembly

6.0 DASHBOARD SUMMARIES

Depending upon assigned database privileges, the user will have an option to select one or more dashboards from the main menu. When the desired dashboard is selected, the user will then have the option to select the Functions tab to view links to the functions and the Reports tab to view links to the reports available from the dashboard. Screen-level and context-level help is available from the dashboard.

6.1 General Report Structure

The following items are displayed on all reports:

- Title page fields: report date/time, report title, version of the report, WDS instance on which the report was executed, User ID of current user, total number of pages in the report, select criteria (as applicable)

- Header of each page: report title, "Waste Isolation Pilot Plant," page number

Reports are available in portable document format (PDF) unless otherwise specified. The default selection criteria are set to a wildcard (%) or NULL value (blank). When a wildcard or NULL value is used for the selection criterion, the WDS will not restrict the query by that parameter. The default date is set to 1/1/1999 for all start date criteria fields, unless otherwise specified. The default date is set to the current date for all end date and single date selection criteria, unless otherwise specified by the user at the time the report is generated. When a container number, payload ID, or shipment number is input or otherwise displayed, the user is provided direct access to the corresponding container report (e.g., container data report, overpack data report, canister data report, payload report, or shipment summary report).

When establishing parameters to run reports in the WDS, the user may have the option to filter the report being run with a specified date range. This is accomplished using the date calendar function. The user clicks the  icon to open the calendar. The calendar for the current month with the current date highlighted appears on the screen (see Figure 6-A).

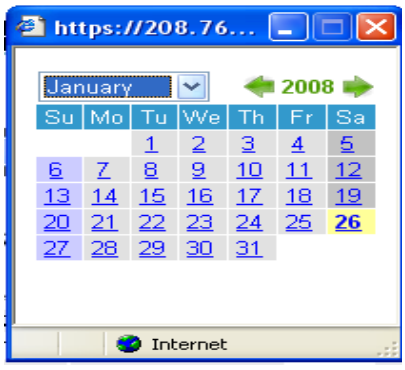

Figure 6-A – WDS Date Calendar Example

To insert a date into the date field, the user clicks the desired day on the calendar. If the start or end date of a different month is needed, the user selects the desired month from the dropdown list. 

If either the start date or end date for the previous calendar year is required, the user uses the green arrows to toggle back to previous years. When the day, month, and year have been selected, the user clicks on the highlighted day to insert the date into the field on the report form.

6.2 General User Roles/Access to Reports

DA, TCO, WCO, and Packaging users are allowed to access reports for container, overpack, canister, payload, and shipment records without regard to status.

Confirmation users and Transportation users are allowed to access shipment reports for shipments without regard to status. All other report types are restricted to approved or completed records only (containers, overpacks, payloads).

All other users (Waste Handling Operations, Transportation, New Mexico Environment Department [NMED], EPA, Carlsbad Field Office [CBFO], Safety and Emergency Response, and General WIPP User and Business Reports users) are restricted to reports for approved or completed records only (containers, overpacks, payload, shipments). Access to reports concerning inter-site shipments is restricted to Business Reports, DA, TCO, WCO, and Packaging users.

NOTE: If reference data are not available for a site due to assignment of privileges, refer to the User's Reference Data Report to review assigned privileges.

Refer to screen-level and context-level help for details about all reports that are available from all dashboards.

The following table outlines user roles and characteristics of users who perform the roles. A brief description of the role function is also provided.

Table 1 – WDS Roles and User Characteristics

WDS Role	Typical User Role and Characteristics
Acceptable Knowledge (AK)	The AK dashboard is accessible to users who have the AK role. The dashboard provides access to the CCEM Data Entry, CCEM Review, AK Assessment Date Verification screens, and Basis of Knowledge Evaluation (BOK). Provides AK users the ability to enter and approve AK CCEM data, AK Assessment Date review dates, and Basis of Knowledge Information for WDS waste containers. Users with the additional Chemical Administration role also can access the Master Chemical/Material List Administration screen.
Business Reports	The Business Reports role provides reports to support contract objectives.

WDS Role	Typical User Role and Characteristics
Carlsbad Field Office	The CBFO Dashboard is accessible to the users with CBFO role. It provides access to the Summary, Emplacement, Shipment, and Chemical Compatibility Reports.
Chemical Administrator	Access to the Master Chemical/Material List Admin function is restricted to users who are assigned the AK user role. Allows users in the Packaging group the ability to enter and update Chemical data records used by the AK group for assignment to AK CCEM records.
Shipment Confirmation	WIPP Shipment Confirmation users are members of the Regulatory Environmental Services group at WIPP that monitor shipments for compliance with the Hazardous Waste Facility Permit. The Confirmation group performs container data review on a shipment-waste stream basis. Shipment confirmation approval is required for each to-WIPP shipment processed in the WDS.
Data Administrator (DA)	The DAs are members of the National TRU Program's Waste Information Tracking Systems group with background and training in both the software and applicable regulatory documentation. Allows qualified WDS DA to insert, expire, and modify WDS Reference Data, and User Account information. WDS DAs also approve Waste Container and Shipment Data, and Override the Payload Assembly PE-Ci limits for assemblies that exceed the material at risk (MAR) Limit after approval by Nuclear Safety. DAs can be contacted for any WDS support.
EPA	The EPA role provides system access for users from or who represent the EPA. Read only access to query and report functionality is provided to users from the perspective of compliance with EPA regulations.
General WIPP User	WIPP user may include individuals in management, technical support, or Quality Assurance (QA) positions within the DOE complex who have a need to review container, payload, or shipment data from an individual record or report perspective on an occasional basis.
NMED	The NMED role provides system access for users from or who represent the NMED. Read only access to query and report functionality is provided to users from the perspective of compliance with the HWFP.
Packaging	The WIPP Packaging Implementation and Technical Support group reviews containers, payloads, and shipments for compliance with the TRAMPAC documentation. Allows users in the Packaging Group to enter and update TRUCON and Shipping Category information used by the CH TRUPACT-II TRAMPAC, 72-B RH-TRAMPAC, and CH TRUPACT-III TRAMPAC for transporting waste containers to WIPP.
WIPP Safety and Emergency Response	The WIPP Safety and Emergency Response Dashboard is accessible to users with the Safety and Emergency Response role. The dashboard provides access to the General Query function, Nuclide Report, and On-Site Waste Location Report.

WDS Role	Typical User Role and Characteristics
Transportation Certification Official (TCO)	Allows WIPP Transportation Certification Officials the ability to create Dunnage, Payloads and Shipments within WDS for shipment to an approved Destination Site. Inter-site shipments may also be received by TCOs.
WIPP Site Transportation	WIPP Transportation Management personnel are involved with scheduling and receipt of shipments to and from the WIPP facility. Allows members of the WIPP Transportation Subject Matter Experts (SME) the ability to enter the WIPP Shipments receipt dates and update WIPP Tractor and Trailer information.
Waste Certification Official (WCO)	Allows WIPP Waste Certification Officials the ability to enter, modify, and delete Waste Container Information, and create CH Overpack containers, and RH Canisters for shipment to WIPP.
Waste Handling Operations	WIPP Waste Handling Operations personnel are involved with processing and emplacement of waste, and emplacement of MgO. Allows the Waste Handling Operations staff the ability to enter the waste and MgO emplacement information, update Waste Assembly process dates and Package Vent Dates, and enter Site Derived waste container data and WIPP emplacement information.

NOTE: The following WDS database dashboard roles are read only and do not allow User to modify any WDS data: Business Reports, CBFO, EPA, NMED, Safety and Emergency Response, and WIPP User.

6.3 Transportation Certification Official (TCO) Dashboard Functions

The functions and reports available from the TCO dashboard are shown in Figure 6-B. Additional details about functions performed by TCO users are described in screen-level help. Screen-level help provides additional details about reports accessible from this dashboard.

The WDS will allow users to plan and create payloads using certified containers, and plan and create shipments using approved payloads. Access to the shipment data entry function is restricted to the TCO user group. The TCO user can create a new shipment record or edit an existing shipment record. Options are provided to allow the user to create dunnage for inclusion in a shipment due to weight limitation, fissile gram equivalent (FGE) limitation, Gas Generation limitation, or other limitation. The TCO may also receive inter-site shipments to designated destination sites.

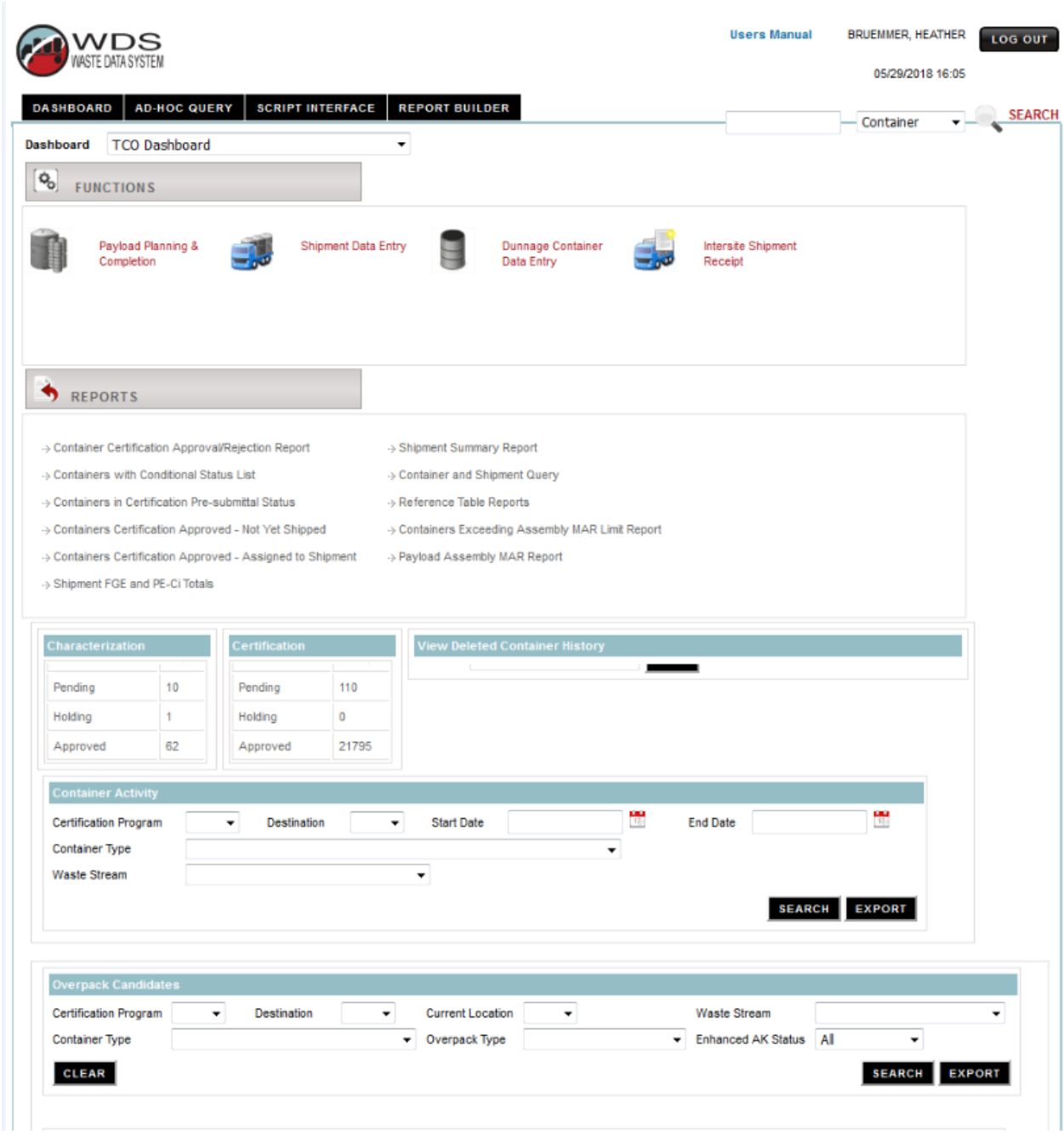

Figure 6-B – Transportation Certification Official Dashboard

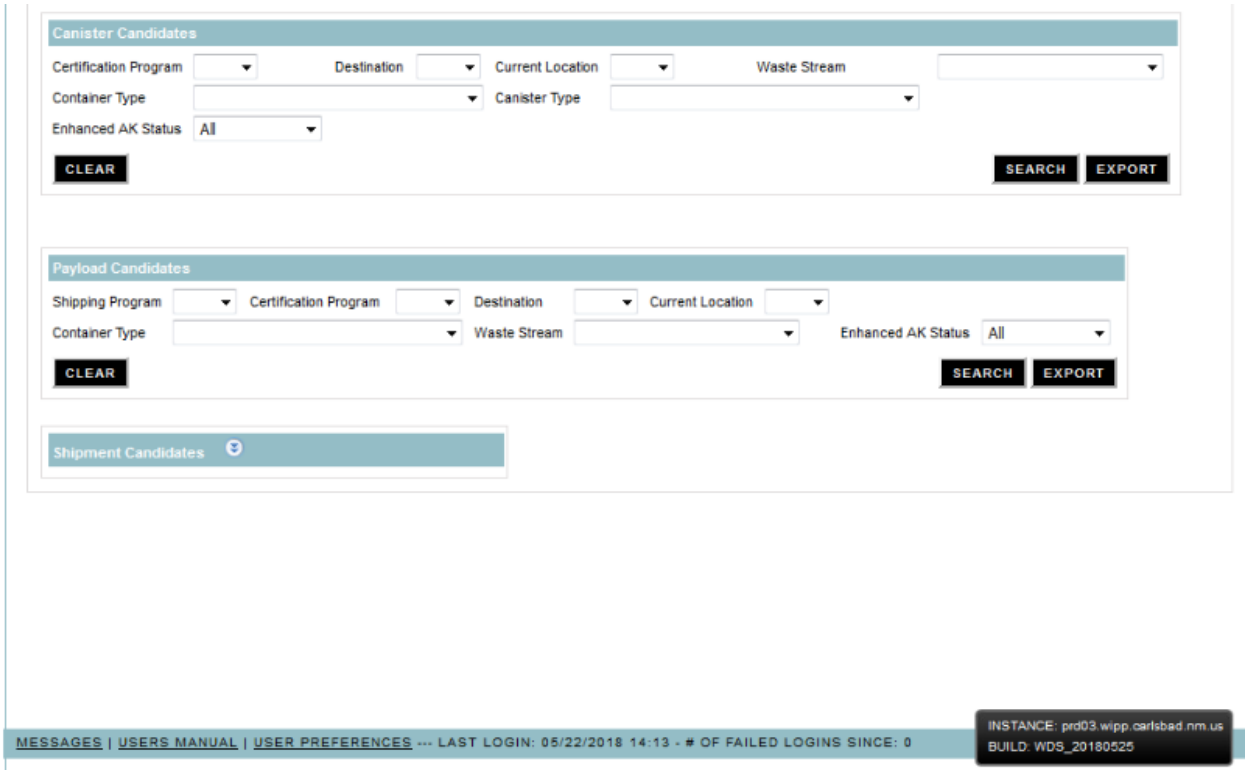

Figure 6-B – Transportation Certification Official Dashboard (cont)

The user can associate one or more payloads with a shipment in New Shipment (NEW_SHIP) status. The user can delete payloads and all associated packaging data, from the active shipment record if the shipment has a (NEW_SHIP) status. The WDS automatically populates the shipment Governing Shipping Period field with the minimum governing shipping period for payloads associated with the shipment. Visual attributes are provided to enable users to distinguish containers (and their associated assemblies and/or payloads if applicable) in Pending Certification Data Approval status from those in Certification Data Approved status within the shipment data entry function.
The WDS automatically populates the Handling Material Weight field with the Handling Material Weight specified in the Packaging/Container Types reference table for the given packaging and container type of the payload as the default value. After one Payload has been selected, the user has the option to add an Empty Package. The user is limited to two Empty Packages per shipment. Inner Containment Vessel/Inner Vessel (ICV/IV) Closure Date must include time of closure. The WDS automatically provides a candidate list of payloads, where the selection criteria include completed payloads saved to the database with the Shipping Program ID, Current Location, and Destination Site ID of the active shipment that have not been assigned to a shipment. As payloads are added to the shipment, the WDS limits the list of payload candidates to payloads of the same handling code of the payloads already assigned to the shipment. For each candidate payload, the WDS displays the payload governing shipping period and PCB indicator flag.

The WDS calculates and displays the following total fields for payloads associated with the active shipment: Package Weight, Payload Weight and Error (kg), FGE and 2 x Error, Decay Heat & Error (W), and Pu-239 Equivalent Curies (PE-Ci). For each total shipment error field, the WDS automatically calculates the total as the Root Sum Square, or square root of the sum of the squares of the payload errors.

The user has access to the payload data (via the Payload Data Report) for each payload associated with the active shipment. The user can save the shipment record without submitting the record. The WDS enables the save function if a unique shipment number has been entered. Upon successful save of a shipment not previously saved, the WDS sets the shipment record to New Shipment status and records the insertion into the database in the shipment status history table. The overall shipment status is displayed (i.e., New, In Review, Complete, En Route, or Received). The overall shipment status is displayed with respect to the following three subcomponents of the shipment status: confirmed status, DA review status, and shipment data finalized status. When the shipment is submitted to the review process, the WDS executes the preliminary shipment edit/limit check evaluation. If the shipment passes the preliminary shipment edit/limit check evaluation, the WDS automatically sets the shipment status to In Review, records the status change in the shipment status history table, sends an email to the Confirmation Team distribution list stating the shipment is ready for confirmation review (WIPP destination site only), and sends an email to the Data Administrator Team distribution list stating the shipment is ready for DA review (WIPP destination site only). If the shipment fails the preliminary shipment edit/limit check evaluation, the WDS provides access to the detailed results for the shipment edit/limit check evaluation. The user can submit the active shipment to the final shipment edit/limit check evaluation if the shipment data have not already been finalized. The WDS updates the shipment data finalized status to TRUE and records the shipment finalization in the shipment status history table if the shipment passes the final shipment edit/limit check evaluation. If the shipment fails the final shipment edit/limit check evaluation, the user is provided access to the detailed results for the shipment edit/limit check evaluation.

All shipment data, with the exception of Send Date, are protected from update for a shipment record with shipment data finalized status = TRUE. The user can update a shipment in Complete (COMPLETE_SHIP) status to En Route status and record the change in status in the shipment status history table. All shipment data, including the Send Date, are protected from update for a shipment with an En Route status. The applicable errors from the most recent shipment edit/limit check evaluation are displayed. The user can delete shipment records in New Shipment status or shipment records in In-Review status that are not confirmed and not DA approved. The WDS automatically clears all payload associations to the shipment when a shipment is deleted. The user can reset the shipment status to New Shipment for the active shipment and the WDS will automatically record the reset in the shipment status history table if it is in "In Review" status and has not been confirmed. If the shipment has DA approval, the WDS automatically removes the approval and sends an email to the confirmation team distribution list stating the shipment is no longer available for confirmation review (WIPP destination site only).

The user can set the shipment data finalized status to FALSE if the shipment is in a status prior to En Route status. When the shipment data finalized status is set to FALSE, the WDS updates the shipment status to “In Review” and records the status change in the shipment status history table.

The user has access to the Payload Assembly Transportation Certification Document (PATCD) reports for one or more TRUPACT or HalfPACT payloads assigned to the active shipment. The user has access to the Payload Transportation Certification Document (PTCD) report for one or more RH 72-B payloads assigned to the active shipment. The user can access the Payload Container Transportation Certification Document/Overpack Payload Container Transportation Certification Document (PCTCD/OPCTCD*)* report for payload containers assigned to the active shipment and for all payload containers and associated inner containers (as applicable) assigned to the highlighted payload. The user can access the Shipment Summary Report for the displayed shipment.

Exporting Files

The TCO dashboard provides access to the following CSV file export functions:

- Containers meeting the selected overpack candidate query parameters
- Containers meeting the selected canister candidate query parameters
- Containers meeting the selected payload candidate query parameters
- Container activity query function that displays the total number of containers inserted, approved (first time DA certification approval), and shipped which meet the selected query criteria
- Container activity query results
- Containers in pre-submittal certification status query
- Certified containers not shipped query
- Containers assigned to shipment query
- Shipment PE-Ci and FGE query

6.4 Waste Certification Official Dashboard

The functions and reports available from the WCO dashboard are shown in Figure 6-C. Additional details about the functions performed by WCO users are described in screen-level help. Screen-level help provides additional details about reports accessible from this dashboard. The WDS will allow users to upload container data, submit containers for characterization and certification, create RH Canisters and CH Overpacks.

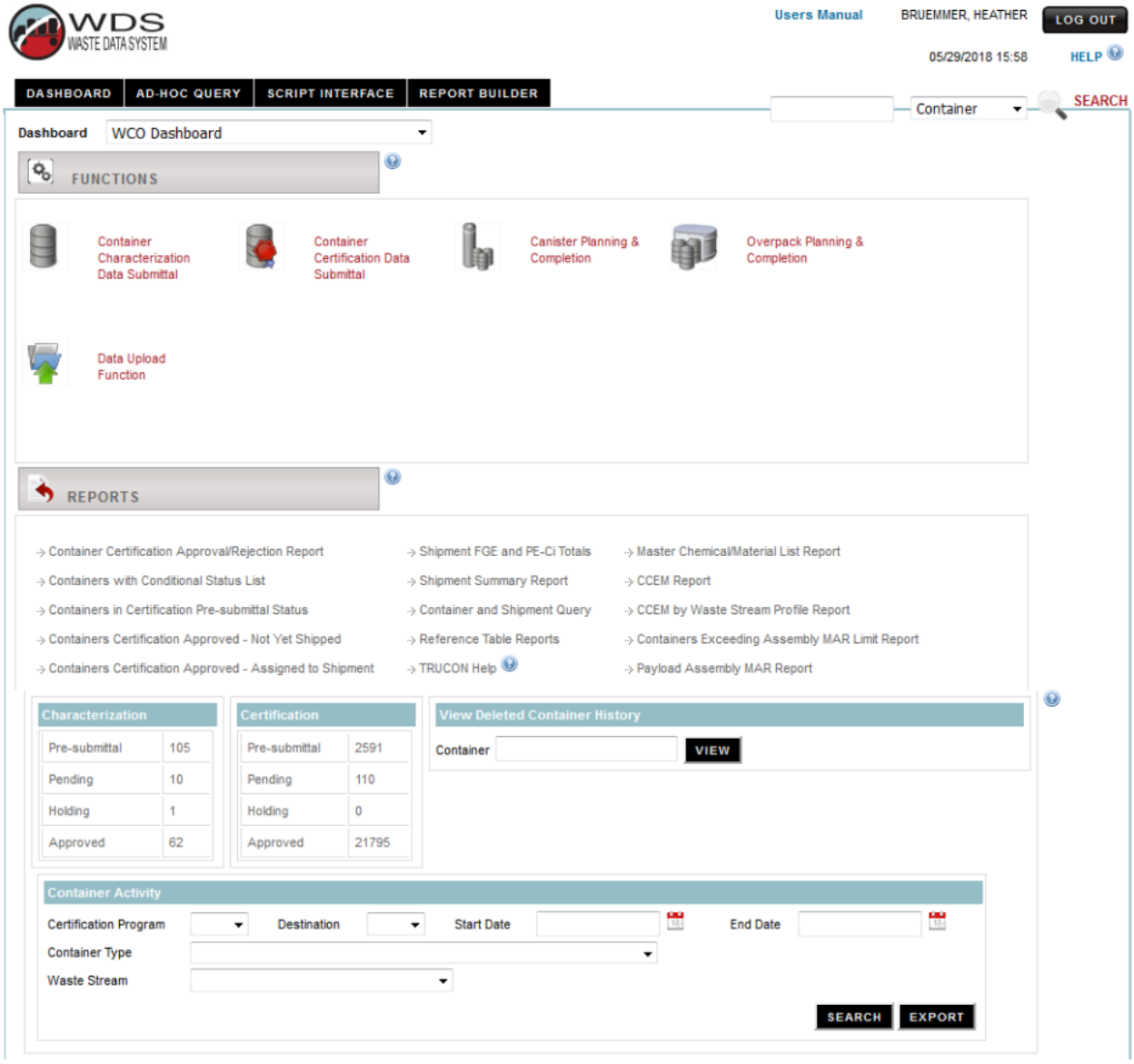

Figure 6-C – Waste Certification Official Dashboard

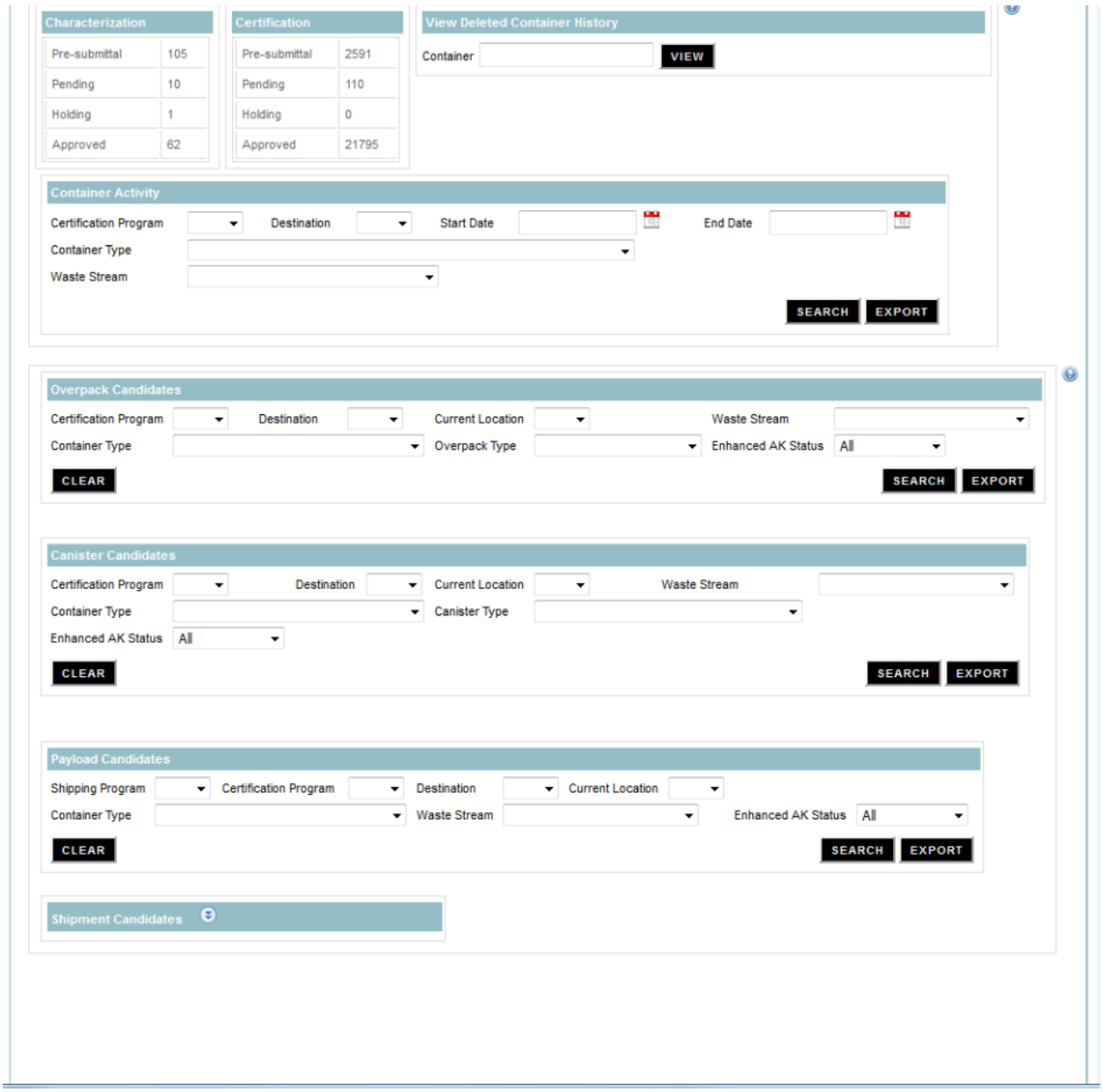

FIGURE 6-C Waste Certification Official Dashboard (cont)

Exporting Files

The WCO dashboard provides access to the following CSV file export functions:

- Containers meeting the selected overpack candidate query parameters
- Containers meeting the selected canister candidate query parameters
- Containers meeting the selected payload candidate query parameters
- Container activity query function that displays the total number of containers inserted, approved (first time DA certification approval), and shipped which meet the selected query criteria
- Container activity query results
- Containers in pre-submittal certification status query
- Certified containers not shipped query
- Containers assigned to shipment query
- Shipment PE-Ci and FGE query

The WCO dashboard also provides access to the following informational reports

- Reference Table Reports
- TRUCON Help
- Master Chemical Lists and CCEM
- MAR Payloads and Containers

6.5 Waste Handling Operations Dashboard

The functions and reports that are available from the WIPP Waste Handling Operations dashboard are shown in Figure 6-D. Details about the Shipment Receipt function performed by WIPP Waste Handling Operations and Transportation users are described in an approved WIPP TRU waste receipt procedure. The Manual Emplacement function must be used for emplacement of RH waste containers. Details about waste emplacement at WIPP are provided in WIPP Waste Handling Operations procedures. Screen-level and context-level help provides additional details about generating reports that are accessible from this dashboard.

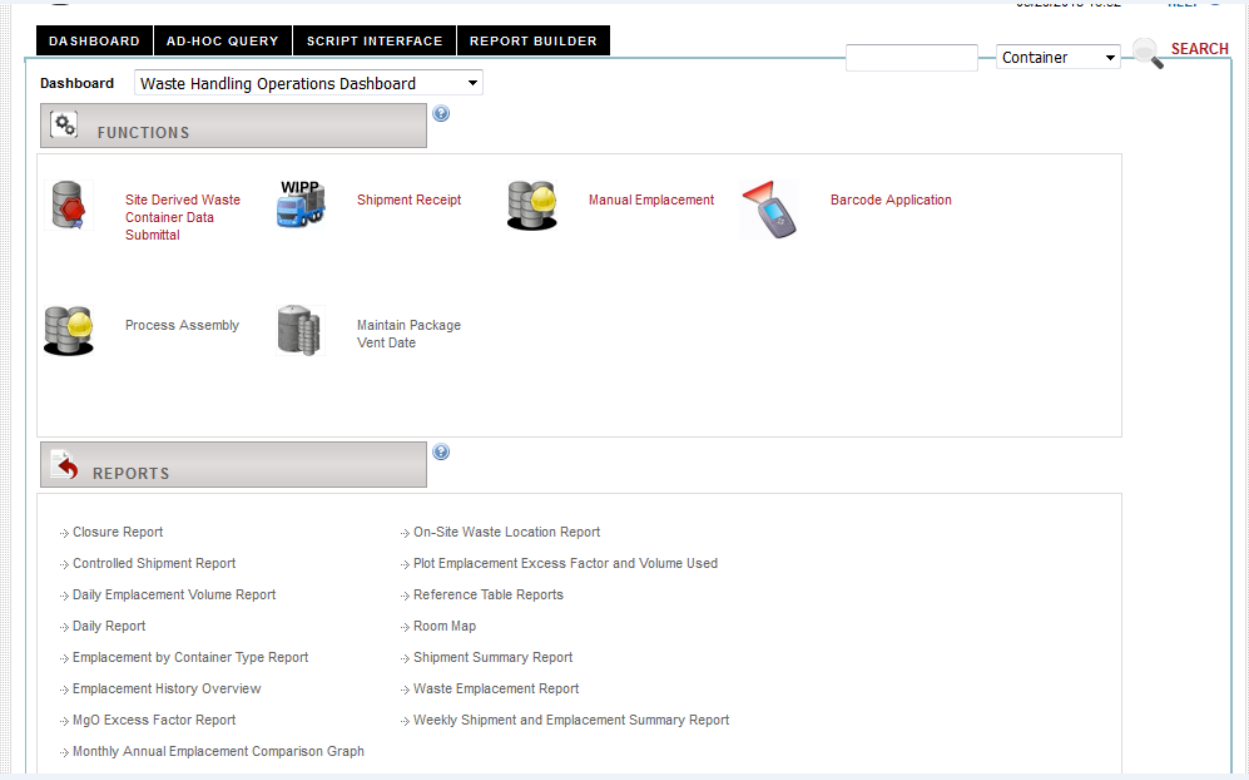

Figure 6-D – Waste Handling Operations Dashboard

6.6 Shipment Confirmation Dashboard

Allow user to view detailed data. Requirements for TRU-Mixed waste confirmation are described in the WIPP HWFP, Att. C (7). Functions and reports available from the Shipment Confirmation dashboard are shown in Figure 6-E. Details about use of functions available from this dashboard, as well as details about generating reports are further explained in screen-level and context-level help.

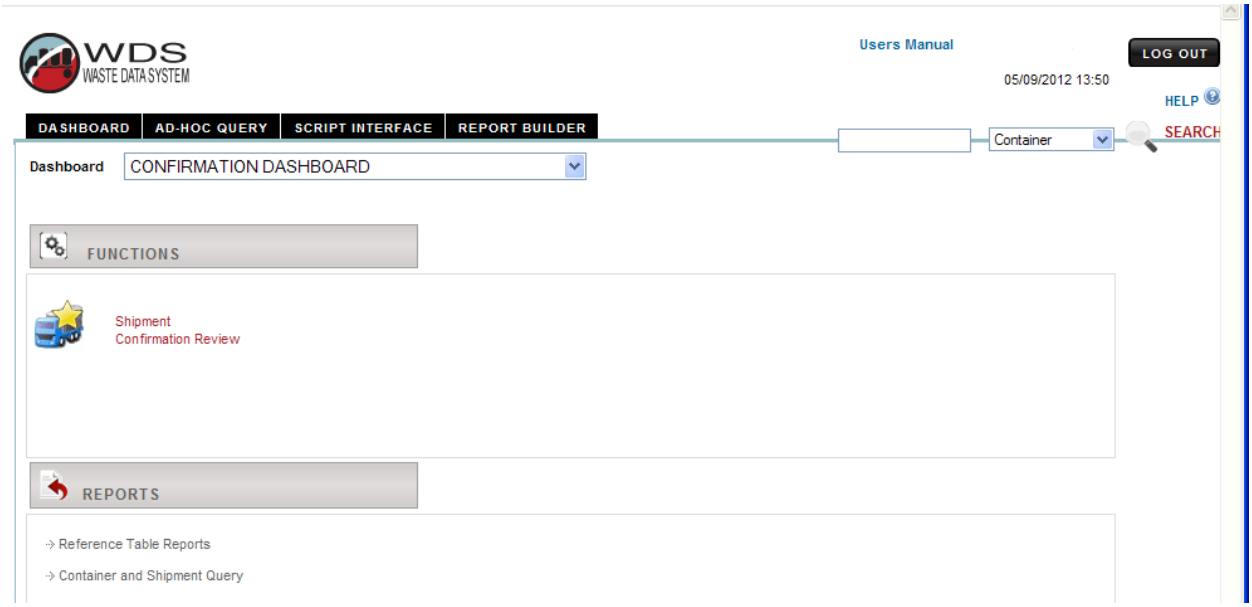

Figure 6-E – Confirmation Dashboard

The Shipment Confirmation Review page provides several other report links:

The *Payload Container List* report generates a PDF listing of container number and container type for each container in the shipment, grouped by waste stream and payload.

After the confirmation process is complete, the user clicks the confirm button located at the bottom of the form. The user is given the opportunity to cancel or to continue with the "confirmation" action. The shipment status will then be updated to Confirmed. Additional details about the functions performed by WIPP Shipment Confirmation users are contained in the WIPP HWFP and approved WIPP procedures for waste stream shipment confirmation. Screen-level and context-level help provides additional details about reference table reports accessible from the Confirmation dashboard.

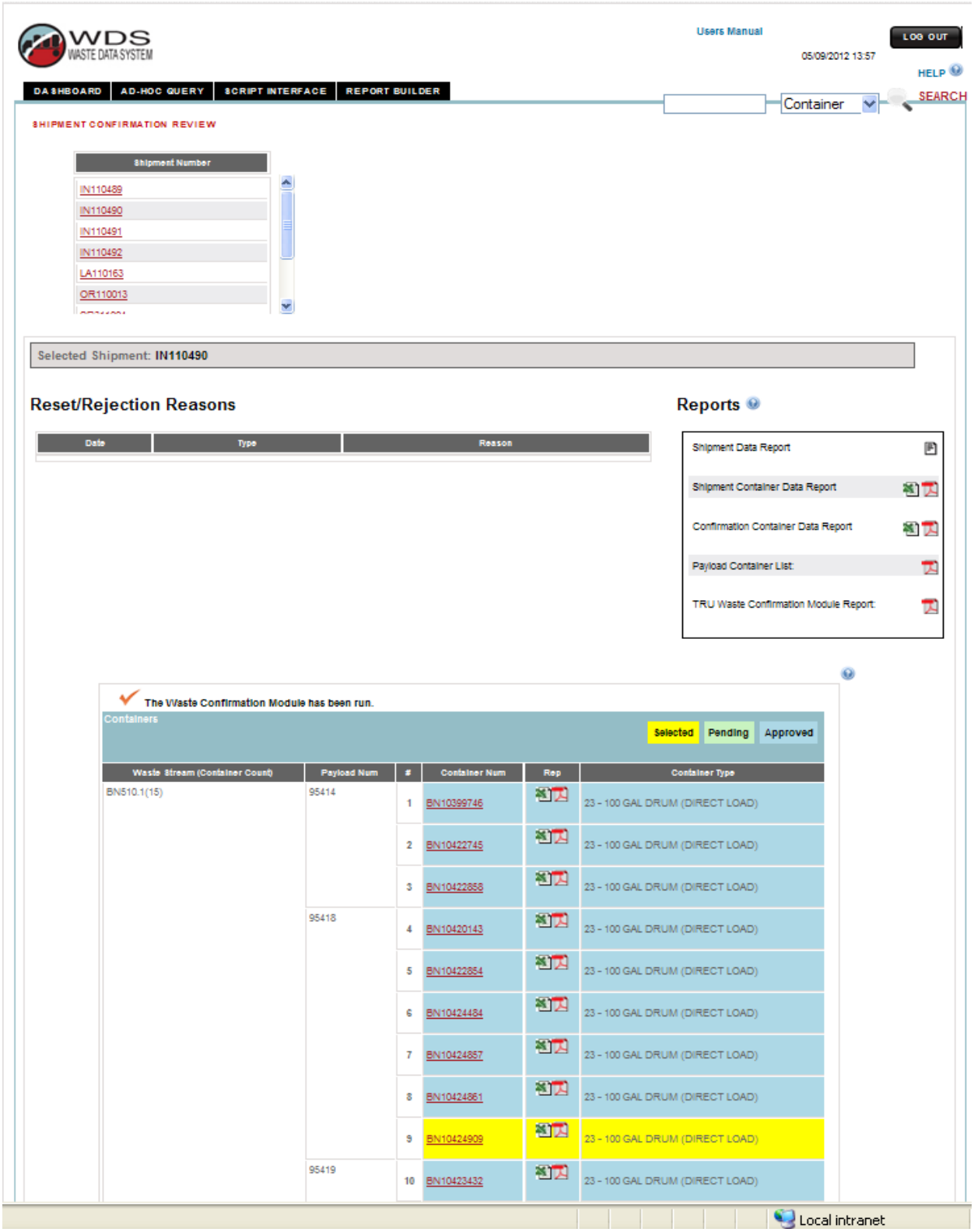

Figure 6-F – Shipment Confirmation Review Page

6.7 Packaging Dashboard

NOTE: The Chemical Administrator link can only be viewed if the user has the Chemical Administrator role.

Functions and reports available from the Packaging dashboard are shown in Figure 6-G. Additional details about functions performed by WIPP Packaging Engineering users are described in approved procedures and in screen-level and context-level help. The dashboard provides access to the Master Chemical/Material List Administration function, limited to those in the Chemicals Administrator role. The dashboard also provides access to the PCTCD, OPCTCD, PATCD, and PTCD reports when viewing DA-approved containers or overpacks associated with completed payloads (PCTCD, OPCTCD). The dashboard provides access to Reference Table Reports. Screen-level and context-level help provides details about generating reports accessible from the Packaging dashboard.

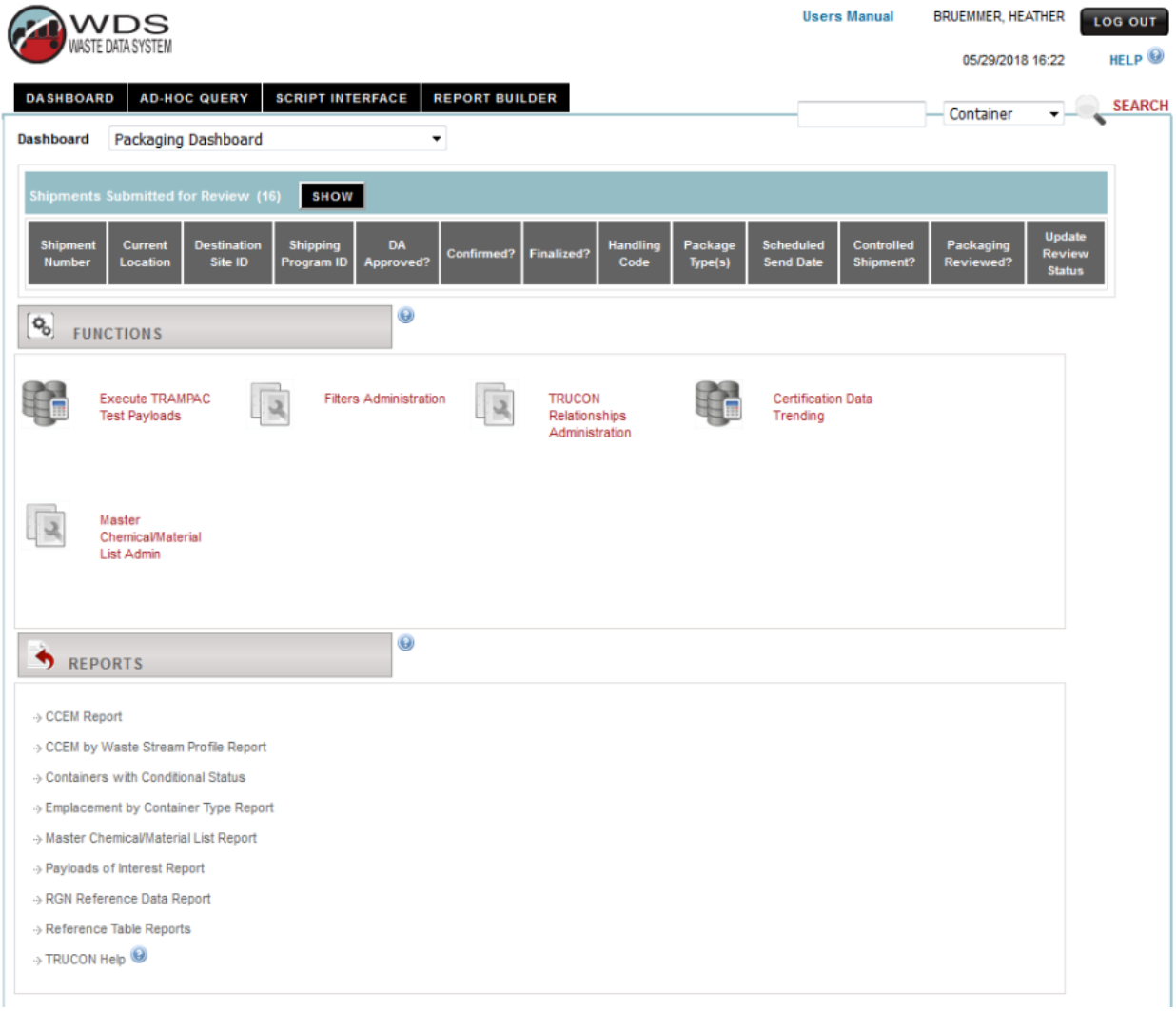

Figure 6-G – Packaging Dashboard

6.8 General WIPP User Dashboard

Reports available to users from the WIPP User dashboard are shown in Figure 6-H. The WIPP user may view reports but does not perform any data input functions using the WDS. Screen-level and context-level help contains additional details about generating reports accessible from the WIPP User dashboard.

Figure 6-H – WIPP User Dashboard

6.9 CBFO Dashboard

The CBFO dashboard is accessible to users with the CBFO role. The CBFO dashboard provides access to reports as shown in Figure 6-I. The CBFO user may view reports but does not perform any data input functions using the WDS. Screen-level and context-level help contains additional details about generating reports that are accessible from the CBFO dashboard.

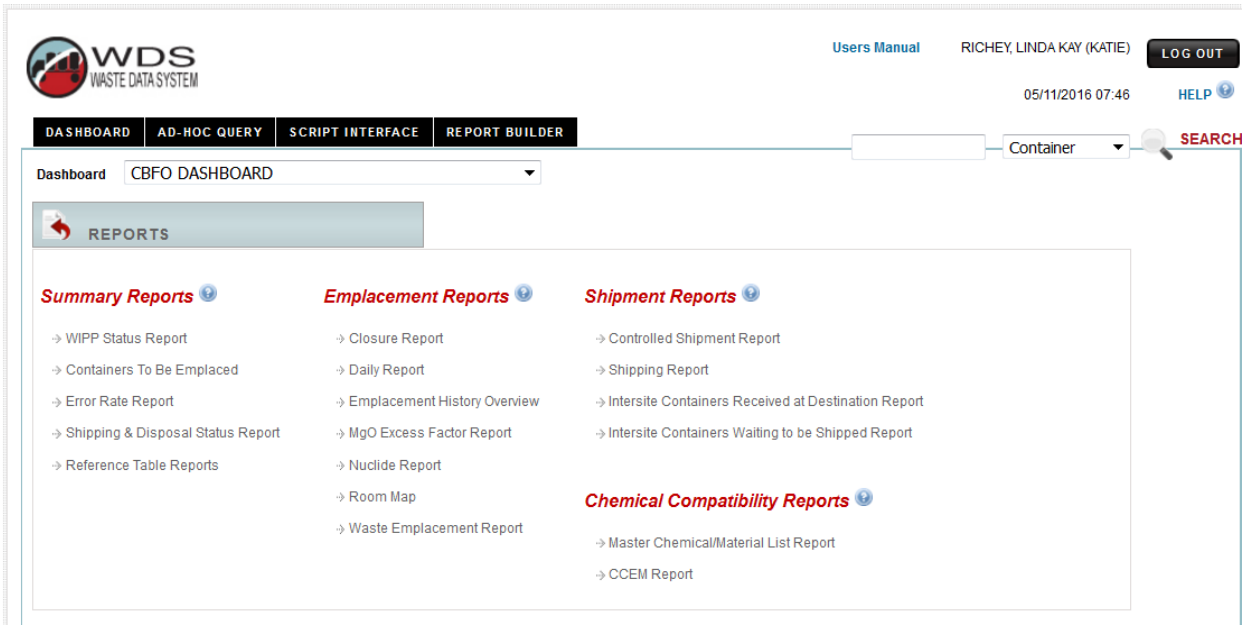

Figure 6-I – CBFO Dashboard

6.10 Data Administrator Dashboard

Functions and reports are available from the WIPP Data Administrator dashboard. Additional details about Container/Shipment Review and Approval functions are summarized in an approved WIPP Waste Information Tracking System (WITS) program plan. Details about Data Administration Reference Table maintenance functions are described or summarized in an approved WIPP WITS program plan. The WDS Data Dictionary is maintained by WITS personnel and is updated for each WDS Release.

6.11 New Mexico Environment Department Dashboard

Reports that are available to users from the NMED dashboard are shown in Figure 6-J. The NMED users have access to reports but do not perform any data entry functions using the WDS. Refer to screen-level and context-level help for additional details about generating reports that are accessible from the NMED dashboard.

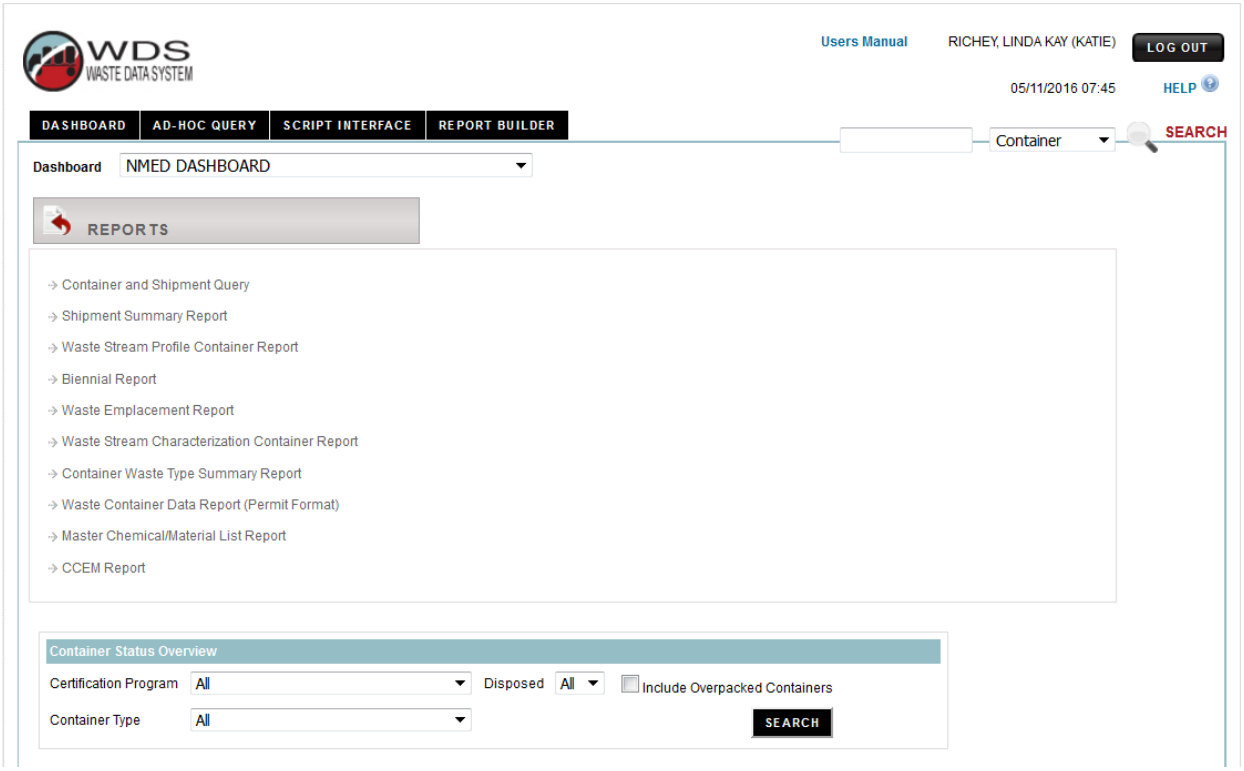

Figure 6-J – NMED Dashboard

6.12 Environmental Protection Agency Dashboard

Reports that are available to users from the EPA dashboard are shown in Figure 6-K. Screen-level and context-level help provides additional details about generating reports that are accessible from the EPA dashboard.

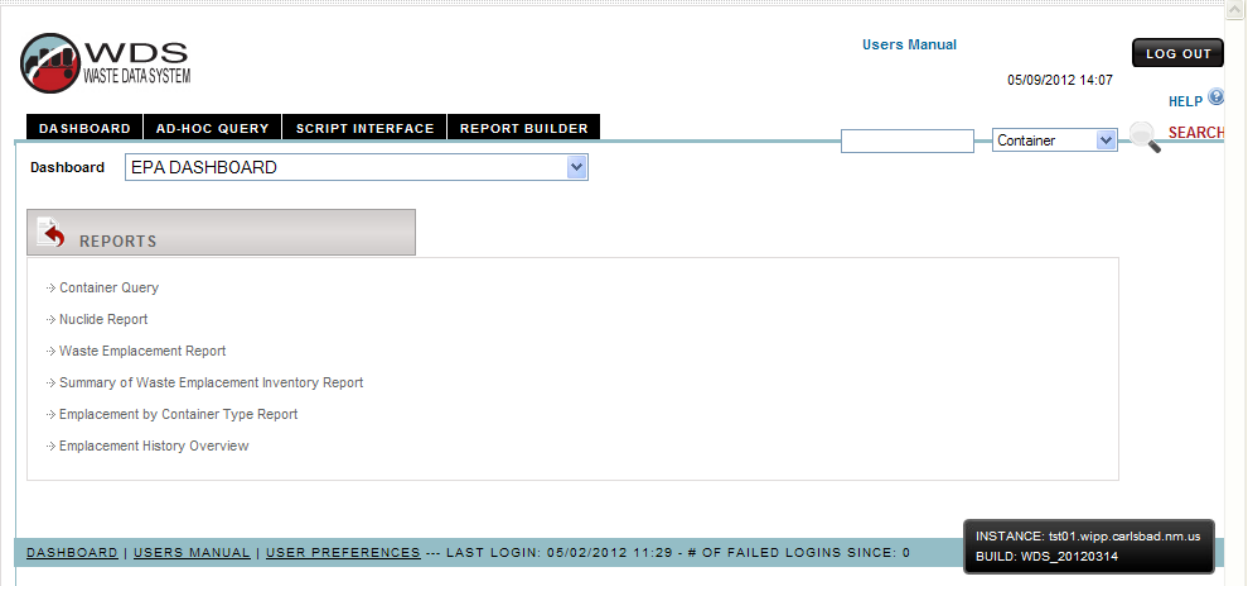

Figure 6-K – EPA Dashboard

6.13 WIPP Safety and Emergency Response Dashboard

Reports available to users from the Safety and Emergency Response dashboard are shown in Figure 6-K. Screen-level and context-level help provides additional details about generating reports accessible from this dashboard.

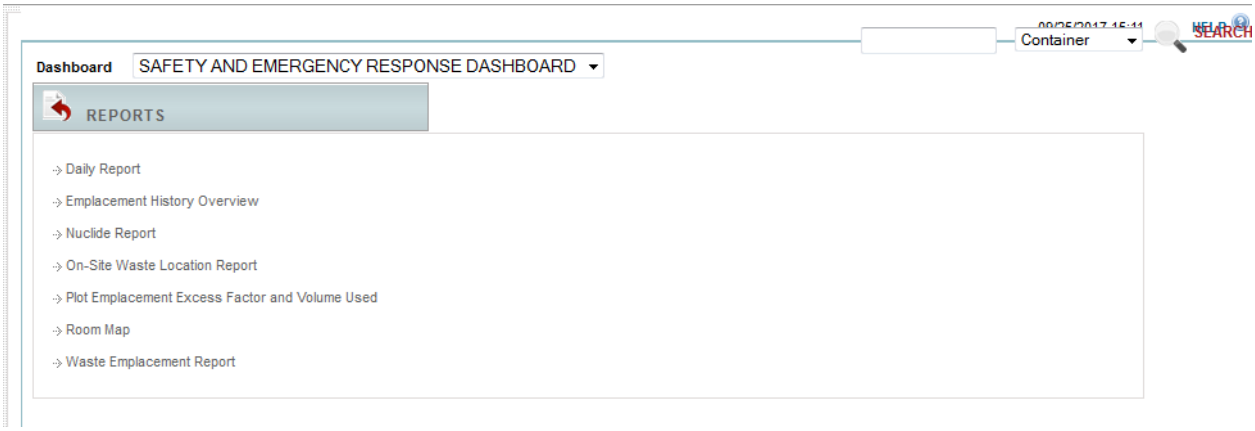

Figure 6-L – Safety and Emergency Response Dashboard

6.14 WIPP Site Transportation Dashboard

Functions and reports available to WIPP personnel from the Transportation dashboard are shown in Figure 6-M. Additional details about Shipment Receipt and Tractor/Trailer Administration functions performed by Transportation users are summarized in approved WIPP procedures and in screen-level and context-level help. Details about the shipment receipt process at WIPP are described in an approved WIPP TRU waste receipt procedure and in screen-level and context-level help. Screen-level and context-level help provides additional details about generating reports accessible from Transportation dashboard.

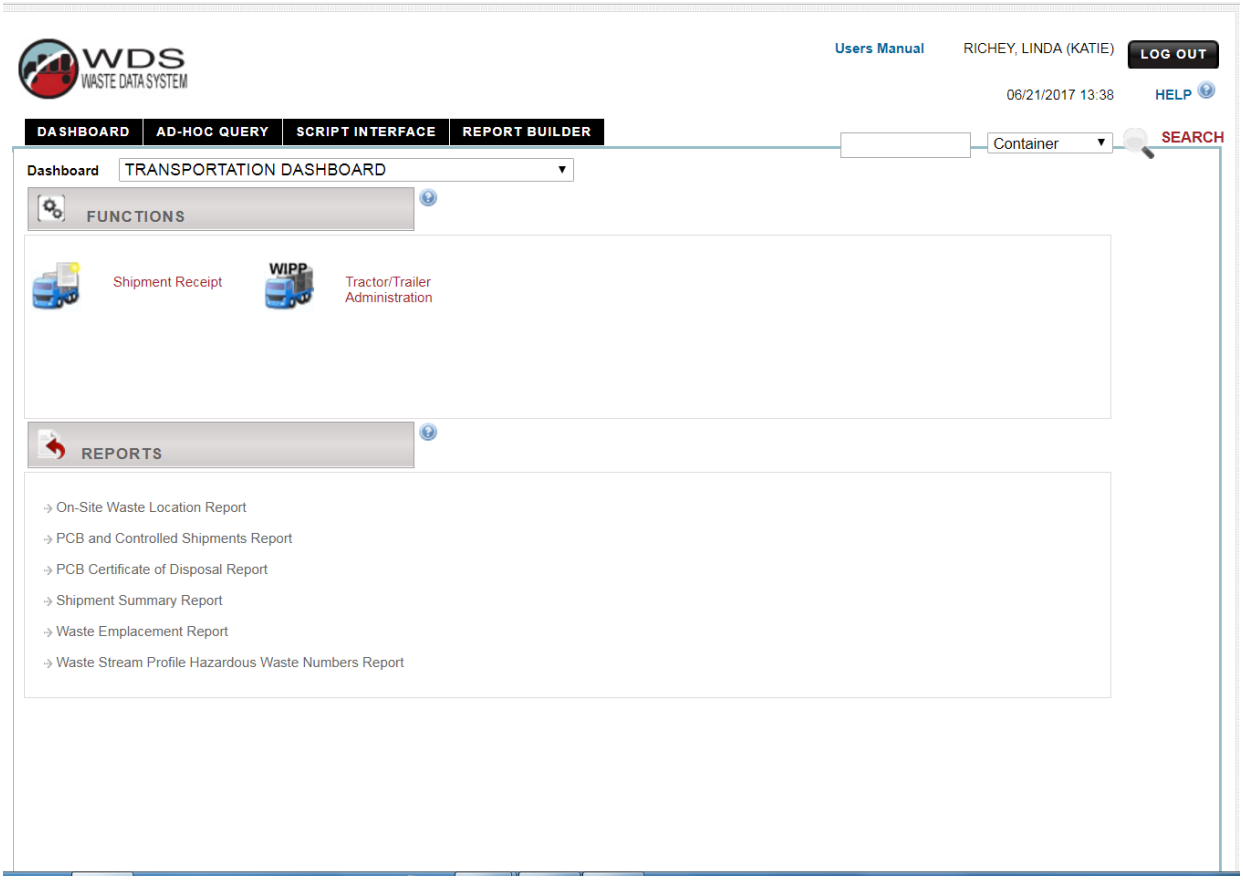

Figure 6-M – Transportation Dashboard

6.15 Business Reports Dashboard

The Business Reports dashboard is accessible only to users with the Business Reports role. The dashboard provides access to reports shown in Figure 6-N. Screen-level and context-level help provides additional details about generating reports accessible from this dashboard.

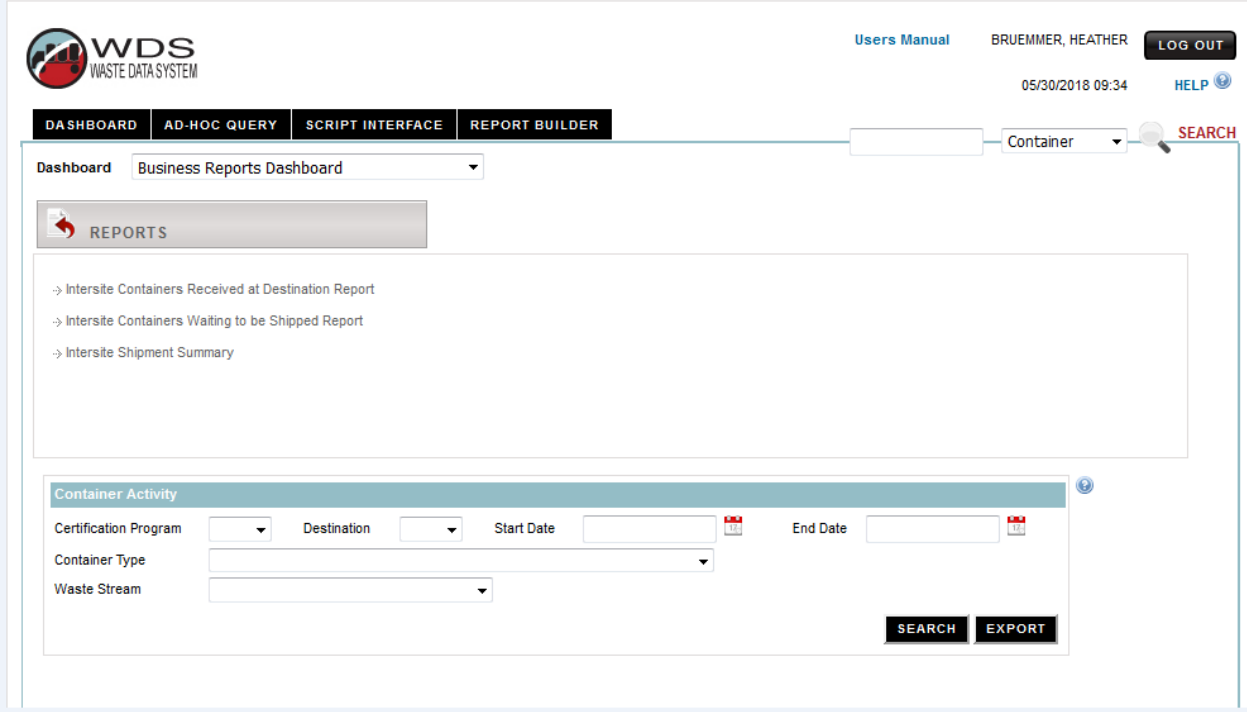

Figure 6-N – Business Reports Dashboard

6.16 Acceptable Knowledge Dashboard

The AK dashboard provides access to the CCEM Administration function, access to the CCEM Review function, and the BOK. The dashboard also provides access to the AK Assessment Date Review function. The dashboard provides access to the Master Chemical List report, the Reactivity Group Numbers reference data report, the CCEM report, and the CCEM by Waste Stream Profile report. Screen-level and context-level help provides additional details to the users about data entry functions and generating reports accessible from this dashboard as shown in Figure 6-O, AK Dashboard.

As part of the process for characterizing and certifying TRU waste for disposal at WIPP, it is necessary to consider the range of possible chemical combinations that could occur in each waste stream. The evaluation considers potential adverse chemical reactions (e.g., generation of fire, explosion, heat, or fumes) from chemicals which may be present in waste to assure safe and compliant transportation and waste management. The evaluation considers compatibility of waste materials and chemicals performed to assess RCRA characteristics for ignitable (D001), corrosive (D002), and reactive (D003) wastes. Site procedures provide an Example Form and Content Guide for the CCEM

and provide a template for preparation of a CCEM to document the assessment. Revisions to the AK Summary Report include a description of the results described in the CCEM in the Chemical Content Identification section. The Site Project Manager reviews and approves the CCEM.

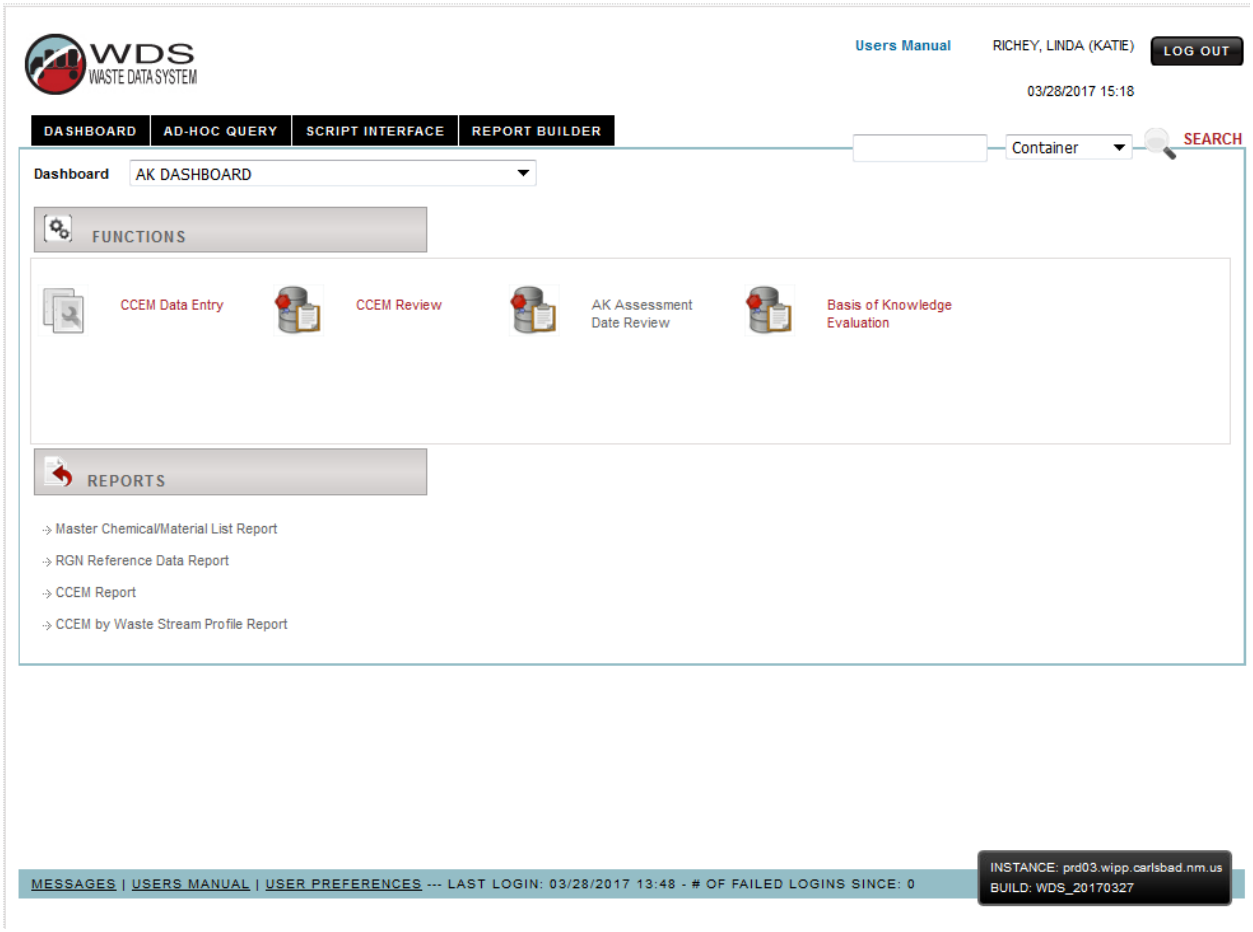

Figure 6-O – AK Dashboard

7.0 SUMMARY OF WDS EVENT CODES

The following event codes are applicable to WDS container, shipment, and disposal data. Users can also refer to the Event Codes Reference Data Report for an online summary of codes and a summary description of each code.

Pre-Submittal to Characterization Approval (PRESUB_CHARZ) – Initial status for containers to be submitted for evaluation before a waste stream profile is approved. The data have been "saved" (but not yet "submitted") to the database.

When a container record is initially entered in the WDS, and if container data are never "saved," but are "submitted" instead, the pre-submittal status will never be assigned to that container. When a "submit" function is performed, a "save" function is also automatically performed.

Pending Characterization Data Approval (PENDING_CHARZ) – When a user "submits" a container record to the WDS for characterization approval, and the container data pass the edit/limit checks, this status is automatically assigned to the container. The container record is now available to the DA for potential characterization data approval, and cannot be modified by the user.

Holding for Characterization Data Approval (HOLDING_CHARZ) – A DA has placed the container record "on hold" while the WCO is investigating a container data issue. The user who submitted the container record will receive a notification from the database whenever the hold status is applied. Depending on the results of the investigation, the DA will approve or reject the container data. Data for containers with this status cannot be modified by the user. The database design incorporates functionality for the DA to describe data issues and resolutions.

Characterization Data Approved (APPROVED_CHARZ) – A status assigned by the WDS to a container record after a DA has reviewed and approved the data, and after the new waste stream profile is approved.

Pre-Submittal to Certification Approval (PRESUB_CERT) – The initial status for waste containers entered into the WDS and "saved" (but not yet "submitted") to the database. This status is applicable to waste containers not part of the characterization submittal and containers successfully submitted for certification approval and subsequently reset by a DA or WCO user. Resetting container records from APPROVED_CERT to PRESUB_CERT allows for correction of data entry errors discovered as part of data quality checks conducted by the sites.

When container data are initially entered in the WDS, and if container data are never "saved," but "submitted" instead, this status will never be assigned to that container. When a "submit" function is performed, a "save" function is also automatically performed. A container pending certification data approval or certification data approved status can be reset by the DA to pre-submittal to certification approval status.

Pending Certification Data Approval (PENDING_CERT) – Assigned by the WDS to a container record when the WCO user "submits" a complete set of container data to the database for approval. When the container record is submitted, data are evaluated by the automated WDS edit/limit checks and the CH-TRAMPAC Evaluation Software (CHTES) or RH-TRAMPAC Evaluation Software (RHTES) container evaluation checks. This status is automatically assigned to the container record after data have passed all automated edit/limit checks. The container record is now available to the DA for potential Certification Data Approval, and cannot be modified by the user.

Holding for Certification Data Approval (HOLDING_CERT) – The database design allows the DAs to place containers "on hold" to allow the WCO to investigate a container data issue identified during the data review without deleting the container record from the database. Depending on the results of the investigation, the DA will approve or reject the container data. Data for containers with this status cannot be modified by the user. The database design incorporates functionality for the DAs to describe data issues and resolutions. The user who submitted the container record will receive a notification from the database whenever the hold status is applied.

Certification Data Approved (APPROVED_CERT) – The WDS automatically sends an e-mail message to the user who entered the certification data to provide notification/confirmation the container has been approved. Approved waste containers then become available for selection for assignment into shipment payloads.

If a certified waste container, such as a damaged 55-gallon drum, is designated to-be-overpacked (TBO) into a larger payload container, such as a SWB or TDOP, the APPROVED_CERT status will be the final status for those inner containers, and the WDS container status for the overpack will be modified further during the shipping and WIPP emplacement processes.

New Shipment (NEW_SHIP) – This is the initial status for shipments that have been "saved" but not yet "submitted" in the WDS.

Data must be entered into the Shipment Number data field before a shipment may be "saved." Shipment data may be added, deleted, and modified by the user while the status of the shipment is NEW_SHIP.

NOTE: The following data fields may be NULL when a shipment is submitted: Manifest Number, Shipment Send Date, Tractor ID, Trailer ID, Transporter Name, Package Numbers, Outer Containment Assembly (OCA)/outer container (OC) Lid Numbers, ICV/IV Closure Dates, Dose Rates, Surface Contamination measurement results, and U.S. DOT Description. These fields must be populated by the shipper in order to finalize the shipment. By design, shipments not finalized cannot be electronically received at the Destination Site.

Pending Shipment Data Approval (PENDING_SHIP) – When a user "successfully submits" a shipment in the WDS, the shipment status becomes pending approval. The container status for each waste container assigned to that shipment is automatically set to pending shipment data approval by the database. The shipment data are now available to the DA for potential approval and an email message is automatically sent to the Confirmation Team stating that the shipment is ready to undergo waste stream shipment confirmation.

Shipment Complete (COMPLETE_SHIP) – Automatically assigned to a shipment after all of the required shipment data fields are entered and submitted in the WDS, and after a DA and the Confirmation Team have reviewed the shipment data and completed the required approval steps. It is imperative each shipment be finalized prior actual arrival at WIPP in order to enable WIPP operations personnel to perform their functions in accordance with procedures for shipment receipt.

Shipment En Route (EN_ROUTE) – This status is assigned to a shipment after the shipment has been finalized and has departed the shipper site.

Shipment Has Been Received (RECEIVED_SHIP) – When a shipment is received at the destination site, operations personnel enter the receipt date into the appropriate field on the shipment form. When the date is saved, the status for each waste container in that shipment is automatically set by the database to "Shipment Received." When waste containers are emplaced at WIPP, the disposal date and emplacement location information is recorded at the assembly level. A container is considered emplaced when its emplacement assembly has a non-NULL disposal date. An overpack payload container is considered emplaced when the overpack emplacement assembly has a non-NULL disposal date.

8.0 ROLES AND SITE PRIVILEGES

A user must obtain authorization from a sponsoring manager and be familiar with the system before being allowed to log onto the database (refer to section 15). For example, each user is assigned a role and site access privileges. Each user must be assigned both role and access privileges for the site. Table 2 is a list of site IDs and locations. Refer also to the *Sites/Programs Reference Data Report* for additional details regarding site IDs and locations.

Table 2 – Site IDs and Locations

Site ID	Location
AE	Argonne National Laboratory – East
BC	Battelle-Columbus
BE	Bettis Laboratory (BAPL)
BN	Advanced Mixed Waste Treatment Facility – Idaho
C1	CCP at Savannah River Site – CH Waste
C2	CCP at Argonne National Laboratory – East
C3	CCP at Nevada Test Site
C4	CCP at Los Alamos National Laboratory
C5	CCP at Lawrence Livermore National Laboratory
C6	CCP at Oak Ridge National Laboratory – CH Waste
C7	CCP at Oak Ridge National Laboratory – RH Waste
C8	CCP at Idaho National Laboratory – CH Waste
C9	CCP at Idaho National Laboratory – RH Waste

Table 2 – Site IDs and Locations

Site ID	Location
CA	CCP at Los Alamos National Laboratory – RH Waste
CB	CCP at Savannah River Site – RH Waste
CC	CCP at GE Vallecitos – RH Waste
CD	CCP at GE Vallecitos – CH Waste
CF	CCP at Hanford
CG	CCP at Bettis Laboratory – RH Waste
CH	CCP at Sandia National Laboratories – CH Waste
CI	CCP at Nuclear Radiation Development, LLC – CH Waste
CJ	CCP at Sandia National Laboratories – RH Waste
GE	GE Vallecitos Nuclear Center
IN	Idaho National Laboratory
LA	Los Alamos National Laboratory
LB	Lawrence Berkeley National Laboratory
LL	Lawrence Livermore National Laboratory
MD	Mound Site
MU	University of Missouri Research Reactor
NT	Nevada Test Site
NR	Nuclear Radiation Development, LLC
OR	Oak Ridge National Laboratory
RF	Rocky Flats
RL	Hanford Site
SR	Savannah River Site
WCS	Waste Control Specialists, LLC
WI	Waste Isolation Pilot Plant

NOTE: The physical location of the waste containers is submitted to the database with the certification data and does not automatically change as container data moves through the WDS system.

Refer to the dropdown menus on the data entry forms or the *Sites/Programs Reference Data Report* for a list of valid entries. Due to the variety of valid entries for a single location, site management should provide TCO and WCO users with guidance for correct site entries prior to submittal of container and shipment data to the WDS.

9.0 AD HOC QUERIES

Access to ad hoc query is granted to users authorized for ad hoc query use by the DA when setting up the user account in WDS. Management approval for ad hoc query access is not required. NMED users and EPA users have ad hoc query built into the functions available from the dashboard and special access to ad hoc query is not required for them. The ad hoc query functions may be accessed by clicking the Ad-Hoc Query tab on the dashboard as shown in Figure 9-A. Details for all types of ad hoc queries are described in screen-level and context-level help.

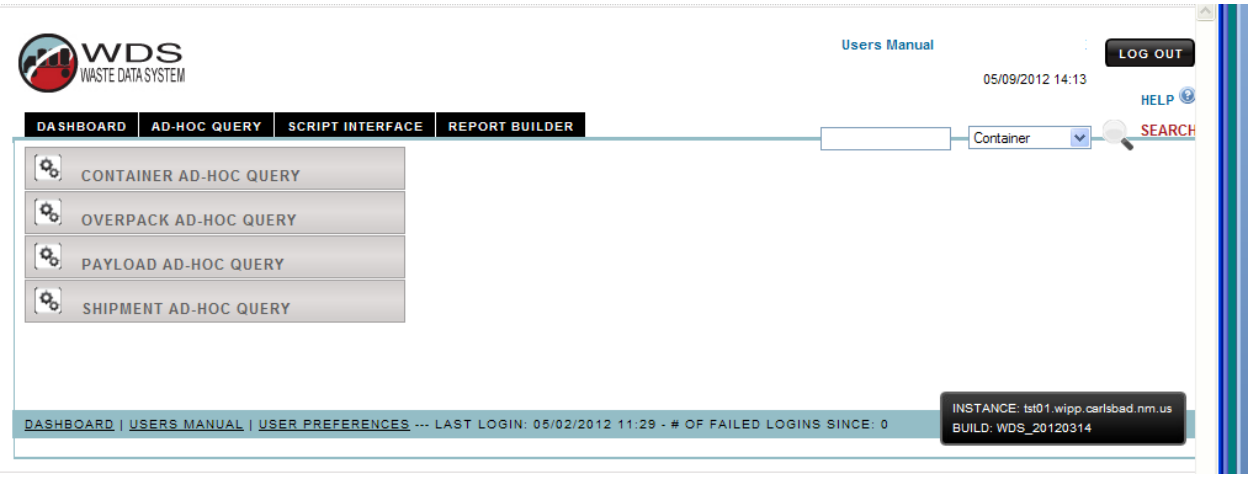

Figure 9-A – Ad Hoc Query Tab

A query may be performed for a container, payload, or shipment, based on input of a specific container ID, payload ID, or shipment ID using the input field and the dropdown menu at the top right-hand corner of the screen.

10.0 SHIPMENT RECEIPT AT WIPP

The WIPP Emplacement Tracking Software tracks CH waste received and emplaced at WIPP. The WDS presents the list of shipments in En Route status with WIPP as the destination site. When a shipment arrives at WIPP, it is considered received when a Waste Handling Technician at WIPP enters the receipt date and time into the WDS. When each payload is unloaded, the payload is scanned or entered into the emplacement tracking software, where the status of each container is updated to "received" status in the WDS. During the shipment receipt process, all container numbers are verified to ensure the correct waste was received (correct packages on the shipment, correct assemblies in each package on the shipment, and correct containers in each assembly in the packages).

11.0 EMPLACEMENT OF WASTE AT WIPP

When waste is emplaced in the repository, the WDS updates the status of each container and assigns and stores a unique location ID for each waste container to enable full traceability of received and emplaced waste. Details about operation of the barcode reader software and the waste emplacement process are covered in approved WIPP procedures. Appendix A provides a summary of the Emplacement Tracking System barcode application and the WDS Manual Emplacement Screen.

12.0 REPORT BUILDER

Access to the report builder functionality is limited to users authorized for report builder use by management. Refer to report builder screen-level help for additional details about use of the report builder function

13.0 RECORDS

The User Manual does not generate any QA records. Those are generated in implementing procedures by the users.

14.0 ACCEPTANCE CRITERIA

Proper completion and submittal of records described in section 13 provides evidence of satisfactory implementation of QA record requirements.

15.0 TRAINING

Personnel needing change access to WDS will have their qualification verified by the sponsoring manager. The sponsoring manager must verify the user is qualified to operate in a manner commensurate with Certified Program Training Requirements. Prior to the access request the sponsoring manager must be of sufficient knowledge and have access to training records to verify the sponsored user has completed requisite training. (Reference DOE/CBFO-94-1012, Quality Assurance Program Document, DOE O 414.1D, Quality Assurance).

On the Job Training (OJT) will be conducted by the requisite department according to their training requirements, i.e., Waste Handling will conduct OJT for Waste Handling Operators. Other training may consist of training on departmental procedures, required reading or special training as documented by the individual department.

16.0 REFERENCES

DOCUMENT NUMBER AND TITLE
10 CFR 71, Packaging and Transportation of Radioactive Material
EPA-600/2-80-076, A Method for Determining the Compatibility of Hazardous Wastes (EPA Method)
DOE O 414.1D, Quality Assurance
DOE/CBFO-94-1012, Quality Assurance Program Document
DOE/WIPP-02-3122, Transuranic Waste Acceptance Criteria for the Waste Isolation Pilot Plant (WAC)
WP 13-1, Nuclear Waste Partnership LLC Quality Assurance Program Document
EA08NT1003-1-0, WDS Access Request Form
WIPP Documented Safety Analysis (DSA)
WIPP Hazardous Waste Facility Permit (HWFP)
WIPP Land Withdrawal Act
DOE National Security and Military Applications of Nuclear Energy Authorization Act of 1980
EPA Approval of DOE RH TRU Characterization Program
National Institute of Standards and Technology (NIST)
Resource Conservation and Recovery Act (RCRA)
Department of Energy Office of Environmental Management Program Security Plan
Transuranic Waste Authorized Methods for Payload Control
Transuranic Package Transporter–Model ll (TRUPACT-ll)
Transuranic-Model lll (TRUPACT-lll)
HalfPACT Certificate of Compliance
RH-TRU 72-B Certificate of Compliance

APPENDIX A – WIPP EMPLACEMENT TRACKING SOFTWARE

A.1 Emplacement of Magnesium Oxide (MgO Sacks)

WIPP Emplacement Tracking Software (ETS) calculates the amount of MgO required in each room being populated with waste based on the amount of CPR included in the emplaced waste material and packaging material. The ETS displays the amount of MgO required, the amount emplaced, and the excess or deficit amount currently in the room. For full MgO traceability, the ETS also assigns and stores a unique sack ID and location data for each sack of MgO emplaced in the repository.

Other features of the ETS include automatic checks verifying all emplaced waste has been assigned a unique location ID and has the correct status. The ETS performs automatic and manual gap checks to ensure all empty emplacement locations are identified while still possible to fill them, or indicates they are intentionally empty. The ETS performs automatic calculation and display of required MgO for expected shipments for production planning. The ETS performs user authorization checking and control to ensure users are properly authorized. The ETS provides full reporting capability for open and closed room data, automatic emailing for daily report tracking, and process management support.

A.2 Barcode Reader

To use the barcode reader or the ETS, the user is required to log on to the system by entering a username and password, clicking the Login button, and reading/accepting the security acknowledgement.

A.3 WIPP ETS Home Page

Once logged on, the WIPP ETS Home Page provides access to emplacement tracking screens and functions. Functional areas include shipment unload data tracking and validation, emplacement data tracking and validation for waste containers, MgO sacks and dunnage containers, review functions to validate emplacement location data, and report functions for the generation of room closure reports, open room daily reports, MgO balance reports, and graphical room display reports. The Home Page also provides access to the manual gap check and manual review check functions for further validation of emplacement data accuracy.

Unload function is used to access the Shipment Unload screen. This allows the user at the destination site to unload the payload from the shipping package.

Emplace function is used to access the Emplacement screen. This allows the WIPP Waste Handling Operations user to emplace waste containers, dunnage assemblies, and MgO sacks. Section A.8 describes the manual emplacement function.

Review function is used by the WIPP Waste Handling Operations user to access the Emplacement Location Review screen. This allows the user (usually a supervisor or crew leader) to review and validate the accuracy of emplacement location data for waste containers.

The *Reports* function allows the user to access the Report Selection screen to retrieve the following reports:

- *MgO Balance Report*
- *Graphical Room Display Report*

Review Check function allows the user to access the Manual Review Check screen and manually perform a location data validation review on a specific row in the selected panel/room combination.

A.4 Barcode Reader/ETS Assembly Validation Screen

Assembly Validation screen displays the assemblies and associated waste containers recorded in the database to be in the selected package. The user scans in or manually enters a container number from the assembly, and the ETS validates the entered number is actually included in the displayed list. After the user enters a container ID and clicks the Validate button, the ETS compares the entered value with the recorded data to validate that the entered container number is associated with one of the displayed assemblies. If the entered number is invalid (not associated with any of the displayed assemblies), the Supervisor Reset screen is displayed for the Supervisor to acknowledge the data discrepancy and reset the system before the user can continue. After the Supervisor resets the system, the display returns to the Package Unload screen for the user to select another package to unload. If the entered container number passes the validation, the Assembly Accept/Reject screen is displayed to provide the user with the ability to validate additional containers in the assembly or accept or reject the entire assembly.

A.5 WIPP ETS Emplacement Location Data Entry Screen

Emplacement Location Data Entry screen provides the user with the ability to display the current location of a container and associated assembly, assign emplacement location data to a waste container and associated assembly, or assign emplacement location data to a dunnage assembly or MgO sack. The ETS verifies the assigned location is available for emplacement and prompts user to enter a new location if the entered location is occupied. Software only allows emplacement where authorized for the different types of containers (Drums, Pipe Overpacks, SWBs, TDOPs, SLB2s, dunnage assemblies, MgO sacks, etc.). The screen is accessed by selecting the Emplace option on the Home Page.

A.6 WIPP Barcode Reader/ETS Emplacement Location Review

The Emplacement Location Review screen provides the user with the functionality to review location data accuracy for newly emplaced assemblies (including dunnage assemblies) and MgO sacks by location data or container number. An automatic review check is executed by the ETS at the completion of the first emplacement in each row. The ETS performs the automatic review on an entire row, two rows back from the row that triggered the automatic review. If the automatic review finds one or more locations in the row that have a status of Review or Rejected, the ETS halts further emplacement activity until the status of these locations is updated to Accepted by a reviewer using this screen and the following Location Accept/Reject screen. After data is entered on the Emplacement Location Review screen and the Review button is clicked, the Location Accept/Reject screen is displayed to enable the reviewer to accept or reject the location data under review.

A.7 Report Selection Screen

Report Selection screen provides access to all available WIPP ETS reports, including the *Balance Report* for MgO balance reporting on a specified room and the *Room Display Report*, for graphically displaying occupancy and location status for all locations in specified range of rows in specified panel/room combination. The software provides the following location data entry fields: Panel Number, Room Number, Handling Type, Target Excess Factor, Expire Date, and Reason.

The report only displays closed rooms and includes the same parameters as displayed in a Daily Report.

A.8 Manual Emplacement of Waste

Figure A-1 – Manual Emplacement Form

Manual Emplacement is further described in approved WIPP Waste Handling Operations procedures and in screen-level online help.

APPENDIX B – WDS CONTAINER DATA SUBMISSION WEB SERVICE

B.1 Web Service Interface

The WDS Web Service is a software tool that is part of the WDS software suite that allows for users to directly submit or transfer container data to the WDS through a web service interface. The WDS Web Service was first developed in 2013 as part of WDS release 2.4. The primary user of the WDS Web Service was initially the Integrated Data Center (IDC) software utilized by the Central Characterization Program (CCP) group at WIPP. It is the preferred method for all submission of container data that is performed outside of the WDS application.

The Web Service Interface allows Users with a valid WDS user ID and the WCO role to transfer waste container data from the certification program systems. The Web Service Interface can perform data validation and transportation checks on submitted waste container data and provide feedback to the calling application. Characterization or Certification waste container data can be transferred to the WDS application without running the data validations, or submitted where the data validation occurs. Sample data can also be submitted for pre-existing WDS containers.

B.2 Web Service Description

The WDS Web Service is a software application that accepts container data as an Extensible Markup Language (XML) string as an embedded object in a Simple Object Access Protocol (SOAP) request for submission to the WDS database. The Web Services Description Language (WSDL) specification for the SOAP request is given in Figure B-1. The service includes options for a basic save, as well as a full certification submittal. The evaluation code for the WDS edit/limit checks and the TRAMPAC evaluations are included as libraries within the web service. Much of the data lookup functions and other logic are directly used out of the included WDS library.

```
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions targetNamespace="http://service.isl.com"
                  xmlns:apachesoap="http://xml.apache.org/xml-soap"
                  xmlns:impl="http://service.isl.com"
                  xmlns:intf="http://service.isl.com"
                  xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
                  xmlns:wsdlsoap="http://schemas.xmlsoap.org/wsdl/soap/"
                  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <wsdl:types>
    <schema elementFormDefault="qualified"
            targetNamespace="http://service.isl.com"
            xmlns="http://www.w3.org/2001/XMLSchema">
      <element name="sendData">
        <complexType>
          <sequence>
            <element name="inData"
                     type="xsd:string"/>
          </sequence>
        </complexType>
      </element>
      <element name="sendDataResponse">
        <complexType>
          <sequence>
            <element name="sendDataReturn"
                     type="xsd:string"/>
          </sequence>
        </complexType>
      </element>
    </schema>
  </wsdl:types>

  <wsdl:message name="sendDataResponse">
    <wsdl:part element="impl:sendDataResponse"
               name="parameters">
    </wsdl:part>
  </wsdl:message>

  <wsdl:message name="sendDataRequest">
    <wsdl:part element="impl:sendData"
               name="parameters">
    </wsdl:part>
  </wsdl:message>

  <wsdl:portType name="WDSWebService">
    <wsdl:operation name="sendData">
      <wsdl:input message="impl:sendDataRequest"
                  name="sendDataRequest">
      </wsdl:input>
      <wsdl:output message="impl:sendDataResponse"
                   name="sendDataResponse">
      </wsdl:output>
    </wsdl:operation>
  </wsdl:portType>
```

Figure B-1 – WDS Web Service WSDL

```
  <wsdl:binding name="WDSWebServiceSoapBinding"
                type="impl:WDSWebService">
    <wsdlsoap:binding style="document"
                      transport="http://schemas.xmlsoap.org/soap/http"/>
    <wsdl:operation name="sendData">
      <wsdlsoap:operation soapAction=""/>
      <wsdl:input name="sendDataRequest">
        <wsdlsoap:body use="literal"/>
      </wsdl:input>
      <wsdl:output name="sendDataResponse">
        <wsdlsoap:body use="literal"/>
      </wsdl:output>
    </wsdl:operation>
  </wsdl:binding>
  <wsdl:service name="WDSWebServiceService">
    <wsdl:port binding="impl:WDSWebServiceSoapBinding"
               name="WDSWebService">
      <!-- The ellipsis in the following location should be replaced with the
           address of the WDS server. SSL errors will have to be ignored for
           SOAP clients that are not part of the WIPPNET
           (wipp.carlsbad.nm.us) domain (e.g., access to the WDS over DOENET)
      -->
      <wsdlsoap:address
                location="https://.../WDSWebService/services/WDSWebService"/>
    </wsdl:port>
  </wsdl:service>
</wsdl:definitions>
```

Figure B-1 – WDS Web Service WSDL (cont)

B.3 Web Service Interface Logic

B.3.1 Entry Point: sendData Method

The only operation provided by the web service is the sendData action. This action accepts a Character Data (CDATA) parameter in XML format with a root element of <dataPacket>. The expectation is that this is the container data, along with username/password and service options, in the XML format specified by the schema in Figure B-2. The CDATA parameter may be XML encoded within the SOAP request.

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
           xmlns:xsd="http://www.w3.org/2001/XMLSchema"
           xmlns:xs="http://www.w3.org/2001/XMLSchema"
           attributeFormDefault="unqualified"
           elementFormDefault="qualified">
  <xsd:element name="dataPacket">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="containerRecordType" type="xsd:string" />
        <xsd:element name="action" type="xsd:string" />
        <xsd:element name="container">
          <xsd:complexType>
            <xsd:sequence>
              <xsd:element name="cntr_num" type="xsd:string" />
              <xsd:element name="ship_site_program_abbr" type="xsd:string" />
              <xsd:element name="curloc_site_program_abbr"
                           type="xsd:string" />
              <xsd:element name="dest_site_program_abbr" type="xsd:string" />
              <xsd:element name="type_code" type="xsd:integer" />
              <xsd:element name="alpha_surf_cont" type="xsd:double" />
              <xsd:element name="aqueous_material" type="xsd:string" />
              <xsd:element name="asp_method_name" type="xsd:string" />
              <xsd:element name="beta_gamma_surf_cont" type="xsd:double" />
              <xsd:element name="be_le_100kg" type="xsd:string" />
              <xsd:element name="be_le_1pct" type="xsd:string" />
              <xsd:element name="be_present" type="xsd:string" />
              <xsd:element name="bg_dose_rate" type="xsd:double" />
              <xsd:element name="cert_date" type="xsd:dateTime" />
              <xsd:element name="cert_site_program_abbr" type="xsd:string" />
              <xsd:element name="closure_date" type="xsd:dateTime" />
              <xsd:element name="compacted" type="xsd:string" />
              <xsd:element name="decay_heat" type="xsd:double" />
              <xsd:element name="decay_heat_uncert" type="xsd:double" />
              <xsd:element name="fill_factor" type="xsd:double" />
              <xsd:element name="gen_site_program_abbr" type="xsd:string" />
              <xsd:element name="gross_weight" type="xsd:double" />
              <xsd:element name="gross_weight_uncert" type="xsd:double" />
              <xsd:element name="handling_code" type="xsd:string" />
              <xsd:element name="idc_code" type="xsd:string" />
              <xsd:element name="layers_of_packaging" type="xsd:integer" />
              <xsd:element name="liner_exists" type="xsd:string" />
              <xsd:element name="liner_lid_present" type="xsd:string" />
              <xsd:element name="matrix_code" type="xsd:string" />
              <xsd:element name="neut_dose_rate" type="xsd:double" />
              <xsd:element name="pcb_mass" type="xsd:double" />
              <xsd:element name="pcb_out_of_service" type="xsd:dateTime" />
              <xsd:element name="pcb_waste" type="xsd:string" />
              <xsd:element name="process_knowledge" type="xsd:string" />
              <xsd:element name="pu239_eq_act" type="xsd:double" />
              <xsd:element name="pu239_fiss_gm_eq" type="xsd:double" />
              <xsd:element name="pu239_fiss_gm_eq_uncert"
                           type="xsd:double" />
```

Figure B-2 – dataPacket Schema for the WDS Web Service sendData Action

```
<xsd:element name="separation_ok" type="xsd:string" />
<xsd:element name="shipping_category" type="xsd:string" />
<xsd:element name="shipping_purpose" type="xsd:string" />
<xsd:element name="trucon_code" type="xsd:string" />
<xsd:element name="tru_alpha_act" type="xsd:double" />
<xsd:element name="tru_alpha_act_conc" type="xsd:double" />
<xsd:element name="tru_alpha_act_uncert" type="xsd:double" />
<xsd:element name="vent_date" type="xsd:dateTime" />
<xsd:element name="wac_rev_num" type="xsd:string" />
<xsd:element name="wst_strm_bir_id" type="xsd:string" />
<xsd:element name="wst_strm_mwir_id" type="xsd:string" />
<xsd:element name="wst_strm_profile" type="xsd:string" />
<xsd:element minOccurs="0"
             maxOccurs="unbounded"
             name="wc_inner_cans ">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="can_num" type="xsd:string" />
      <xsd:element name="closure_date" type="xsd:dateTime" />
      <xsd:element name="filter_diffusivity"
                   type="xsd:double"/>
      <xsd:element name="bg_dose_rate" type="xsd:double" />
      <xsd:element name="neut_dose_rate" type="xsd:double" />
      <xsd:element name="vent_date" type="xsd:dateTime" />
      <xsd:element name="decay_heat" type="xsd:double" />
      <xsd:element name="decay_heat_uncert"
                   type="xsd:double" />
      <xsd:element name="flam_gas_gen_rate"
                   type="xsd:double" />
      <xsd:element name="hydrogen_conc" type="xsd:double" />
      <xsd:element name="rh_layer_type_id"
                   type="xsd:integer" />
      <xsd:element name="sample_date" type="xsd:dateTime" />
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
<xsd:element maxOccurs="unbounded" name="wc_filters">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="filter_model_number"
                   type="xsd:string" />
      <xsd:element name="qty" type="xsd:integer" />
      <xsd:element name="filter_install_date"
                   type="xsd:dateTime" />
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
<xsd:element maxOccurs="unbounded" name="wc_nuclides">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="radionuclide" type="xsd:string" />
      <xsd:element name="activity" type="xsd:double" />
      <xsd:element name="activity_uncert" type="xsd:double" />
```

Figure B-2 – dataPacket Schema for the WDS Web Service sendData Action (cont)

```
        <xsd:element name="mass" type="xsd:double" />
        <xsd:element name="mass_uncert" type="xsd:double" />
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:element maxOccurs="unbounded" name="wc_haz_codes">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="haz_code" type="xsd:string" />
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:element maxOccurs="unbounded" name="wc_mat_parms">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="waste_matl_parm" type="xsd:integer" />
        <xsd:element name="wgt_of_mat_parms" type="xsd:double" />
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:element maxOccurs="unbounded" name="wc_charz_methods">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="method" type="xsd:string" />
        <xsd:element name="charz_method_date"
                     type="xsd:dateTime" />
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:element maxOccurs="unbounded" name="wc_assay_methods">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="method" type="xsd:string" />
        <xsd:element name="assay_date" type="xsd:dateTime" />
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:element minOccurs="0"
               maxOccurs="unbounded"
               name="wc_comments">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="comment" type="xsd:string" />
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:element maxOccurs="unbounded" name="wc_samples">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="sample_num" type="xsd:string" />
        <xsd:element name="date_sampled" type="xsd:dateTime" />
        <xsd:element name="layer_no_sampled"
                     type="xsd:integer" />
        <xsd:element name="sample_type" type="xsd:string" />
```

Figure B-2 – dataPacket Schema for the WDS Web Service sendData Action (cont)

```
                    <xsd:element maxOccurs="unbounded"
                                 name="wc_sample_amounts">
                      <xsd:complexType>
                        <xsd:sequence>
                          <xsd:element name="cas_number" type="xsd:string" />
                          <xsd:element name="method" type="xsd:string" />
                          <xsd:element name="conc_ppm" type="xsd:double" />
                          <xsd:element name="date_analyzed"
                                       type="xsd:dateTime" />
                          <xsd:element minOccurs="0"
                                       name="reporting_flag_b"
                                       type="xsd:string" />
                          <xsd:element minOccurs="0"
                                       name="reporting_flag_d"
                                       type="xsd:string" />
                          <xsd:element minOccurs="0"
                                       name="reporting_flag_e"
                                       type="xsd:string" />
                          <xsd:element minOccurs="0"
                                       name="reporting_flag_j"
                                       type="xsd:string" />
                          <xsd:element minOccurs="0"
                                       name="reporting_flag_na"
                                       type="xsd:string" />
                          <xsd:element minOccurs="0"
                                       name="reporting_flag_u"
                                       type="xsd:string" />
                          <xsd:element minOccurs="0"
                                       name="reporting_flag_z"
                                       type="xsd:string" />
                        </xsd:sequence>
                      </xsd:complexType>
                    </xsd:element>
                  </xsd:sequence>
                </xsd:complexType>
              </xsd:element>
            </xsd:sequence>
          </xsd:complexType>
        </xsd:element>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
</xs:schema>
```

Figure B-2 – dataPacket Schema for the WDS Web Service sendData Action (cont)

B.3.2 sendData Return Value

The sendData action of the web service returns a SOAP response encapsulating the result of the sendData procedure call. Result data is returned as a string in the sendDataReturn parameter of the SOAP response. The result data root XML element is <result> and the schema for the result is provided in Figure B-3. The transmitted XML string may be XML encoded, and the encoding will need to be reversed before deserialization.

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
           xmlns:xsd="http://www.w3.org/2001/XMLSchema"
           xmlns:xs="http://www.w3.org/2001/XMLSchema"
           attributeFormDefault="unqualified"
           elementFormDefault="qualified">
  <xsd:element name="result">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="build" type="xsd:string"/>
        <xsd:element name="status" type="xsd:string"/>
        <xsd:element name="codes">
          <xsd:complexType>
            <xsd:sequence>
              <xsd:element minOccurs="0"
                           maxOccurs="unbounded"
                           name="exit_code"
                           type="xsd:string"/>
            </xsd:sequence>
          </xsd:complexType>
        </xsd:element>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
</xs:schema>
```

Figure B-3 – Result Schema for the WDS Web Service sendData Action

APPENDIX C – WDS ACCEPTABLE KNOWLEDGE INFORMATION WEB SERVICE

C.1 AK Transfer WEB Service

The AK Transfer Web Service is a software tool that is part of the WDS software suite that allows for Users to directly transfer a value for the AK Assessment Date and/or CCEM number and revision for one or more containers, transmitted in container/AK Assessment date/CCEM number/CCEM revision tuples through the Web Service Interface. The AK Transfer Web Service was developed in 2016 as part of WDS release 2.7.1. The AK Transfer Web Service provides a mechanism to update the certification data of submitted and approved containers to include additional AK information that is required by the WAC and chapter 18 of the DSA.

The AK Assessment Web Service Data Transfer provides valid WDS Users with the AK role to transfer the AK Assessment Date, the CCEM number and the CCEM revision number to the WDS application. The AK Assessment Web Service runs basic data validation to ensure the data transmitted is valid. Error messages are sent back when there are errors in the data transmitted. The Open Acceptable Knowledge Evaluation System (OAKES) application used by CCP, and the AK transfer spreadsheet used by Advanced Mixed Waste Treatment Project (AMWTP) are the current interfaces to the AK Assessment Web Service.

C.2 AK Transfer Web Service Description

The AK Transfer Web Service is a software application that accepts container AK data as an XML string as an embedded object in a SOAP request for submission to the WDS database. The WSDL specification for the SOAP request is given in Figure C-1. The data lookup functions and other logic are directly used out of the WDS.

```
<?xml version="1.0" encoding="UTF-8"?>
<wsdl:definitions xmlns:apachesoap="http://xml.apache.org/xml-soap"
                  xmlns:impl="http://service.isl.com"
                  xmlns:intf="http://service.isl.com"
                  xmlns:wsdl="http://schemas.xmlsoap.org/wsdl/"
                  xmlns:wsdlsoap="http://schemas.xmlsoap.org/wsdl/soap/"
                  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
                  targetNamespace="http://service.isl.com">
  <wsdl:types>
    <schema elementFormDefault="qualified"
            targetNamespace="http://service.isl.com"
            xmlns="http://www.w3.org/2001/XMLSchema">
      <element name="sendData">
        <complexType>
          <sequence>
            <element name="inData" type="xsd:string"/>
          </sequence>
        </complexType>
      </element>
      <element name="sendDataResponse">
        <complexType>
```

Figure C-1 – AK Transfer Web Service WSDL

```
        <sequence>
          <element name="sendDataReturn" type="xsd:string"/>
        </sequence>
      </complexType>
    </element>
  </schema>
</wsdl:types>
<wsdl:message name="sendDataResponse">
  <wsdl:part name="parameters" element="impl:sendDataResponse">
  </wsdl:part>
</wsdl:message>
<wsdl:message name="sendDataRequest">
  <wsdl:part name="parameters" element="impl:sendData">
  </wsdl:part>
</wsdl:message>
<wsdl:portType name="AkTransfer">
  <wsdl:operation name="sendData">
    <wsdl:input name="sendDataRequest" message="impl:sendDataRequest">
    </wsdl:input>
    <wsdl:output name="sendDataResponse" message="impl:sendDataResponse">
    </wsdl:output>
  </wsdl:operation>
</wsdl:portType>
<wsdl:binding name="AkTransferSoapBinding" type="impl:AkTransfer">
  <wsdlsoap:binding style="document"
                    transport="http://schemas.xmlsoap.org/soap/http"/>
  <wsdl:operation name="sendData">
    <wsdlsoap:operation soapAction="" style="rpc"/>
    <wsdl:input name="sendDataRequest">
      <wsdlsoap:body use="literal"/>
    </wsdl:input>
    <wsdl:output name="sendDataResponse">
      <wsdlsoap:body use="literal"/>
    </wsdl:output>
  </wsdl:operation>
</wsdl:binding>
<wsdl:service name="AkTransfer">
  <wsdl:port name="AkTransfer" binding="impl:AkTransferSoapBinding">
    <!-- The ellipsis in the following location should be replaced with the
          address of the WDS server. SSL errors will have to be ignored for
          SOAP clients that are not part of the WIPPNET
          (wipp.carlsbad.nm.us) domain (e.g., access to the WDS over DOENET)
     -->
    <wsdlsoap:address location="http://.../AkTransfer/services/AkTransfer"/>
  </wsdl:port>
</wsdl:service>
</wsdl:definitions>
```

Figure C-1 – AK Transfer Web Service WSDL (cont)

C.3 AK Transfer Web Service Interface Logic

C.3.1 Entry Point: sendData Method

The only operation provided by the web service is the sendData action. This action accepts a CDATA parameter in XML format with a root element of <dataPacket> as the inData parameter. The expectation is that this is the container AK data, along with username/password, in the XML format specified by the schema in Figure C-2. The CDATA parameter may be XML encoded within the SOAP request.

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema targetNamespace="http://www.w3.org/XMLSchema.xsd"
           xmlns="http://www.w3.org/XMLSchema.xsd"
           xmlns:xs="http://www.w3.org/2001/XMLSchema"
           xmlns:xsd="http://www.w3.org/2001/XMLSchema"
           attributeFormDefault="unqualified"
           elementFormDefault="qualified">
  <xsd:element name="result">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="userId" type="xsd:string" />
        <xsd:element name="password" type="xsd:string" />
        <xsd:element maxOccurs="unbounded" name="data">
          <xsd:complexType>
            <xsd:sequence>
              <xsd:element name="cntr_num" type="xsd:string" />
              <xsd:element minOccurs="0" name="ak_assessment_date" type="xsd:string" />
              <xsd:element minOccurs="0" name="ccem_number" type="xsd:string" />
              <xsd:element minOccurs="0" name="ccem_revision_number" type="xsd:string" />
            </xsd:sequence>
          </xsd:complexType>
        </xsd:element>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
</xs:schema>
```

Figure C-2 – dataPacket Schema for the AK Transfer Web Service sendData Action

C.3.2 sendData Return Value

The sendData action of the web service returns a SOAP response encapsulating the result of the sendData procedure call. Result data is returned as a string in the sendDataReturn parameter of the SOAP response. The result data root XML element is <result> and the schema for the result is provided in Figure C-3. The transmitted XML string may be XML encoded, and the encoding will need to be reversed before deserialization.

```
<?xml version="1.0" encoding="utf-8"?>
<xs:schema xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
           xmlns:xsd="http://www.w3.org/2001/XMLSchema"
           xmlns:xs="http://www.w3.org/2001/XMLSchema"
           attributeFormDefault="unqualified"
           elementFormDefault="qualified">
  <xsd:element name="result">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="build" type="xsd:string"/>
        <xsd:element name="status" type="xsd:string"/>
        <xsd:element minOccurs="0" name="codes">
          <xsd:complexType>
            <xsd:sequence>
              <xsd:element minOccurs="0"
                           maxOccurs="unbounded"
                           name="exit_code"
                           type="xsd:string"/>
            </xsd:sequence>
          </xsd:complexType>
        </xsd:element>
        <xsd:element minOccurs="0" name="cntr_statuses">
          <xsd:complexType>
            <xsd:sequence>
              <xsd:element minOccurs="0"
                           maxOccurs="unbounded"
                           name="cntr_result">
                <xsd:complexType>
                  <xsd:sequence>
                    <xsd:element name="cntr" type="xsd:string" />
                    <xsd:element name="cntr_status" type="xsd:string" />
                  </xsd:sequence>
                </xsd:complexType>
              </xsd:element>
            </xsd:sequence>
          </xsd:complexType>
        </xsd:element>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
</xs:schema>
```

Figure C-3 – Result Schema for the AK Transfer Web Service sendData Action